



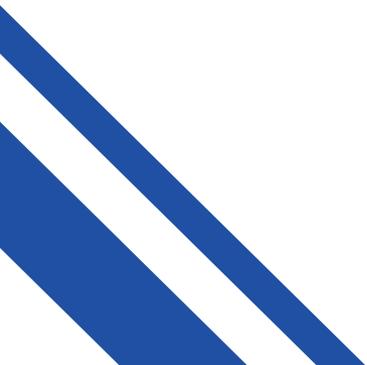
Michigan Learning Connection Summit

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Welcome

Kyle Guerrant

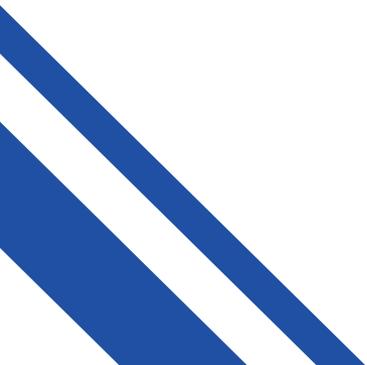
Deputy Superintendent

Finance and Operations

Michigan Department of Education

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Food Insecurity and Learning

- Nancy Lindman, MA, Director of Public Policy, Michigan Association of United Ways
- Kait Skwir, MS, RD, Deputy Director, Food Bank Council of Michigan
- Alicia Guevara Warren, MP AFF, Kids Count Project Director, Michigan League for Public Policy



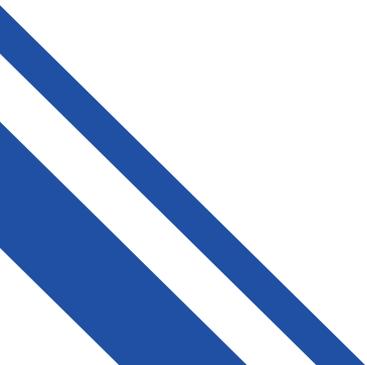
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Meet ALICE



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ALICE[®]

ASSET LIMITED, INCOME CONSTRAINED, EMPLOYED



MICHIGAN

ALABAMA, ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, CONNECTICUT, DELAWARE, **FLORIDA**, GEORGIA, HAWAII, **IDAHO**, ILLINOIS, **INDIANA**, IOWA, KANSAS, KENTUCKY, **LOUISIANA**, MAINE, **MARYLAND**, MASSACHUSETTS, **MICHIGAN**, MINNESOTA, MISSISSIPPI, MISSOURI, MONTANA, NEBRASKA, NEVADA, NEW HAMPSHIRE, **NEW JERSEY**, NEW MEXICO, **NEW YORK**, NORTH CAROLINA, NORTH DAKOTA, **OHIO**, OKLAHOMA, **OREGON**, PENNSYLVANIA, RHODE ISLAND, SOUTH CAROLINA, SOUTH DAKOTA, TENNESSEE, TEXAS, UTAH, VERMONT, **VIRGINIA**, **WASHINGTON**, WEST VIRGINIA, **WISCONSIN**, WYOMING.

2017
UPDATE



Winter 2017

STUDY OF FINANCIAL HARDSHIP

GIVE. ADVOCATE. VOLUNTEER.
United Ways of Michigan
UnitedWayALICE.org/Michigan



ALICE

Asset Limited Income Constrained Employed

Funded by Consumers Energy
and local United Ways

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What does the ALICE Report describe?

- **Household Survival Budget**
- **ALICE Threshold**
- **ALICE Income Assessment**
- **Economic Viability Index**



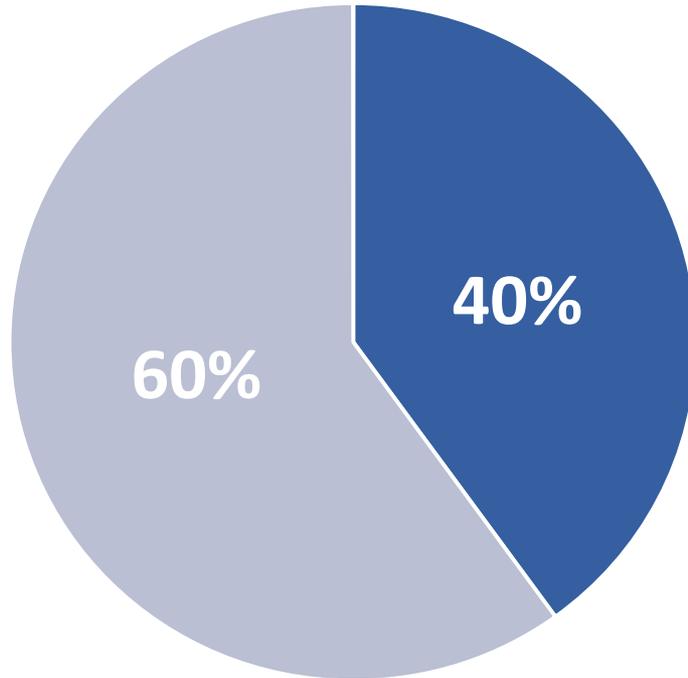
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ALICE Survival Budget

Monthly Costs, Michigan Average, 2015			
	SINGLE ADULT	2 ADULTS, 1 CHILD, 1 PRESCHOOLER	2007 – 2015 PERCENT INCREASE
Monthly Costs			
Housing	\$478	\$696	14%
Child Care	\$-	\$1,108	8%
Food	\$184	\$609	14%
Transportation	\$359	\$718	8%
Health Care	\$183	\$702	77%
Miscellaneous	\$138	\$425	18%
Taxes	\$174	\$414	19%
Monthly Total	\$1,516	\$4,672	18%
ANNUAL TOTAL	\$18,192	\$56,064	18%
Hourly Wage	\$9.10	\$28.04	18%

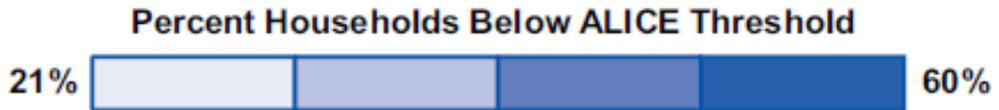
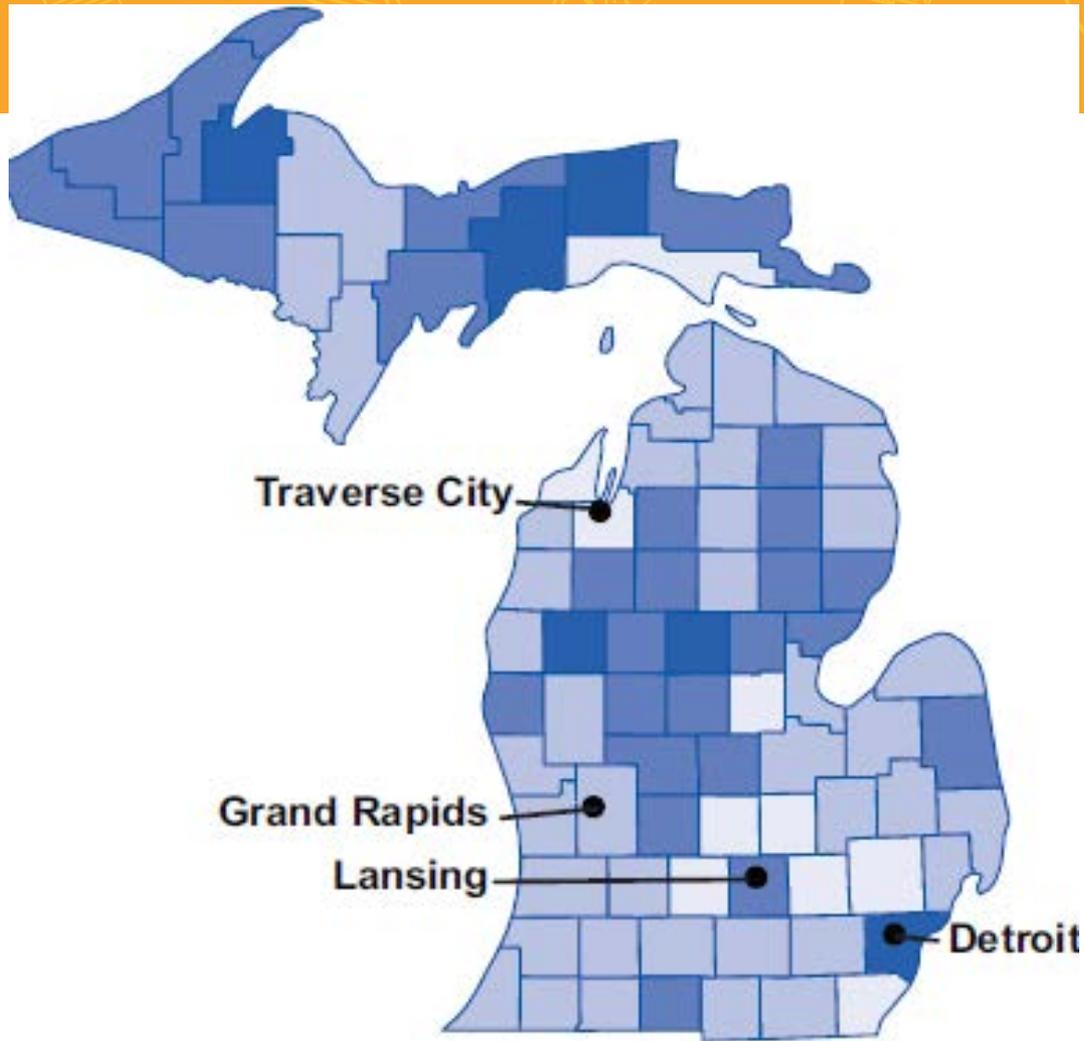
How many households are struggling



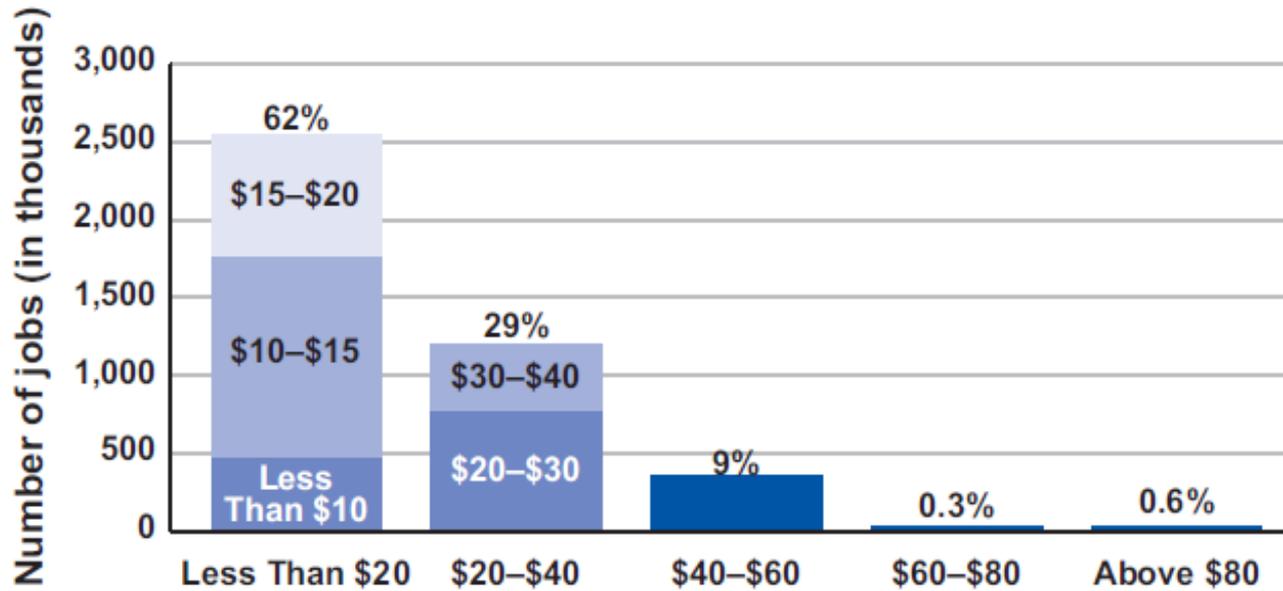
■ **Poverty & ALICE**
15% 25%

■ **Above ALICE Threshold**

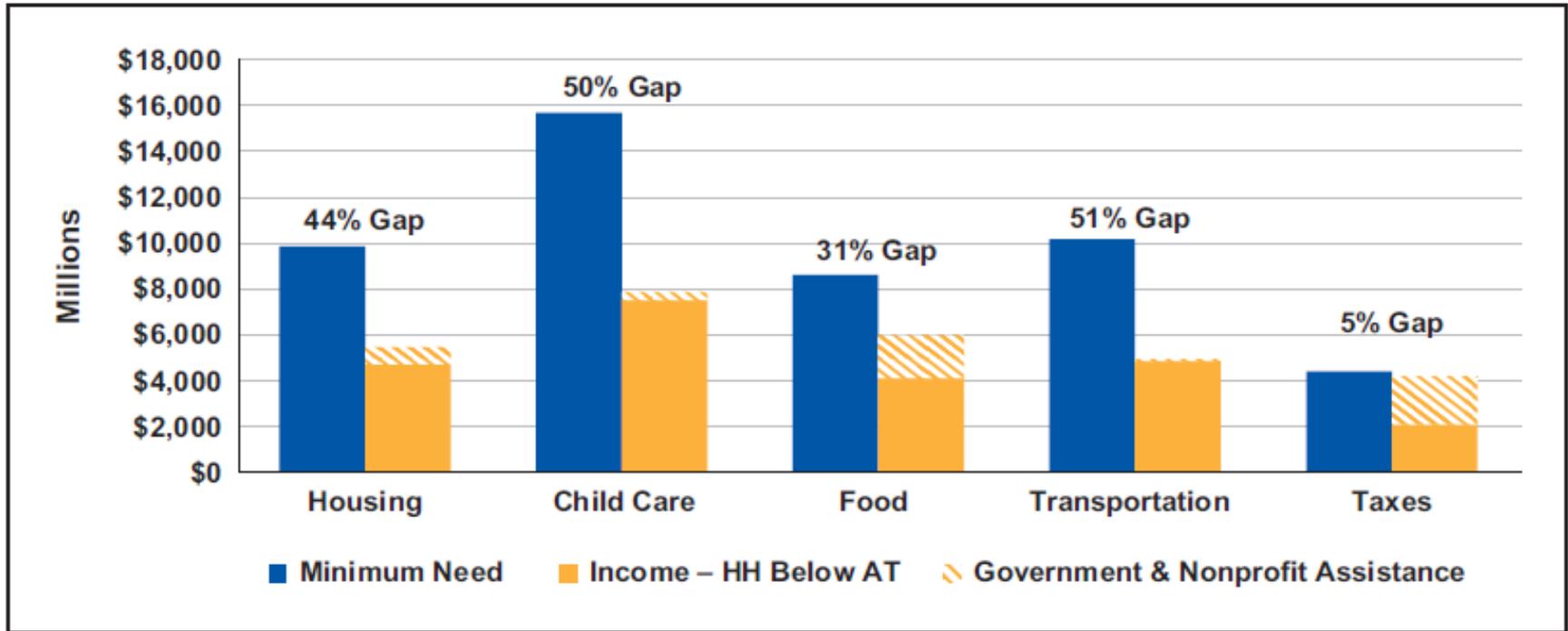
■ ■



How Much Does ALICE Earn?



Basic Needs with Public and Nonprofit Spending



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- For the ALICE Report visit
- www.michiganALICE.org

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The Self-Sufficiency Standard FOR MICHIGAN 2017
PREPARED BY UNIVERSITY OF WASHINGTON SCHOOL OF SOCIAL WORK

food BANK
COUNCIL OF MICHIGAN

The Self-Sufficiency Standard for Michigan 2017

Michigan Learning Connection Summit

5/2/18

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Food Bank Council of Michigan

The Food Bank Council of Michigan's mission is to create a food secure state through advocacy, resource management, and collaboration among stakeholders and Michigan's unified food bank network

- 169 million pounds distributed, 64 million of which were fresh produce
 - Nearly 3,000 pantries
- Food insecurity- 15.1% for general population, 18% for children
- Addressing child food insecurity through: Backpack, summer feeding, after-school/Kids Café, Head Start, Cooking Matters, school pantries



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What is the Self-Sufficiency Standard?

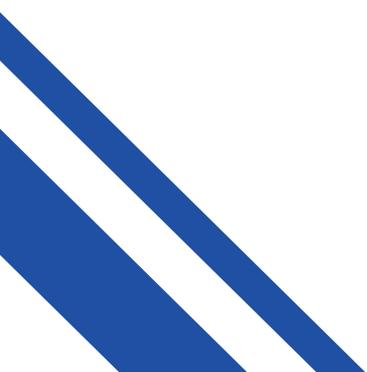
.....

THE SELF-SUFFICIENCY STANDARD IS A MEASURE OF INCOME ADEQUACY THAT IS BASED ON THE COSTS OF BASIC NEEDS FOR WORKING FAMILIES: HOUSING, CHILD CARE, FOOD, HEALTH CARE, TRANSPORTATION, AND MISCELLANEOUS ITEMS, AS WELL AS THE COST OF TAXES AND THE IMPACT OF TAX CREDITS.

.....

THE SELF-SUFFICIENCY STANDARD MEASURES HOW MUCH INCOME A FAMILY OF A CERTAIN COMPOSITION IN A GIVEN PLACE NEEDS TO ADEQUATELY MEET THEIR BASIC NEEDS—WITHOUT PUBLIC OR PRIVATE ASSISTANCE.

.....



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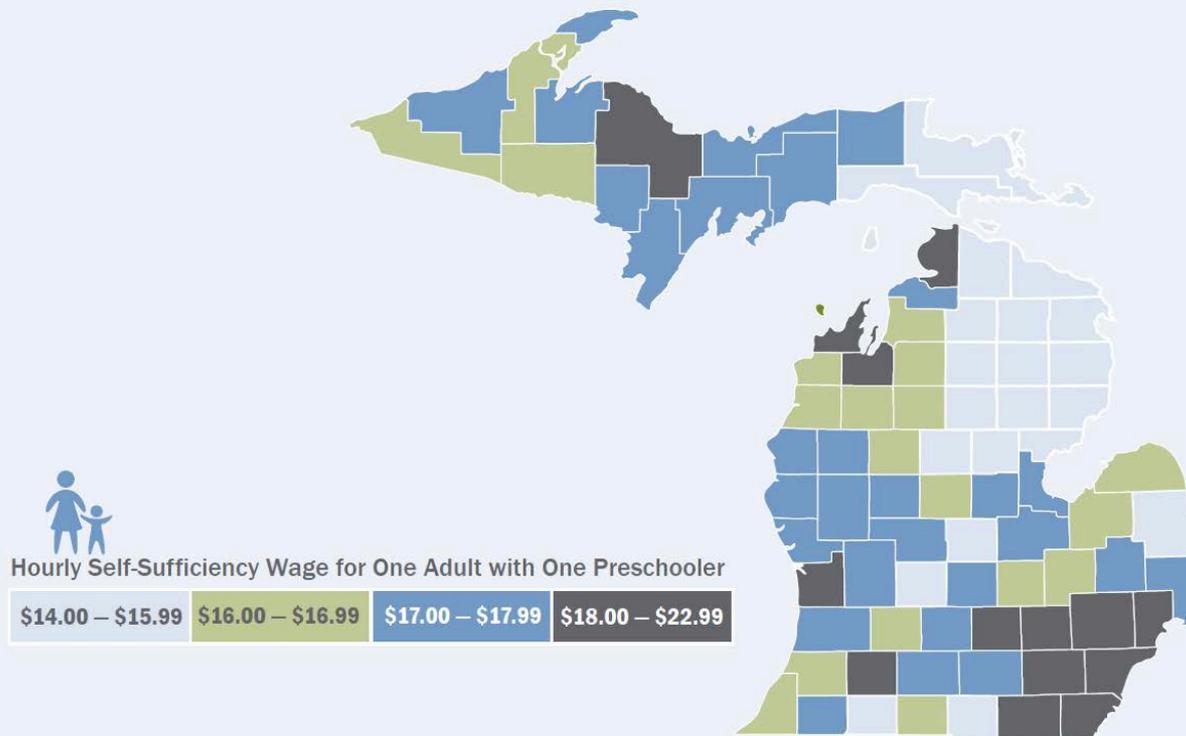
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HOW MUCH IS ENOUGH IN MICHIGAN?

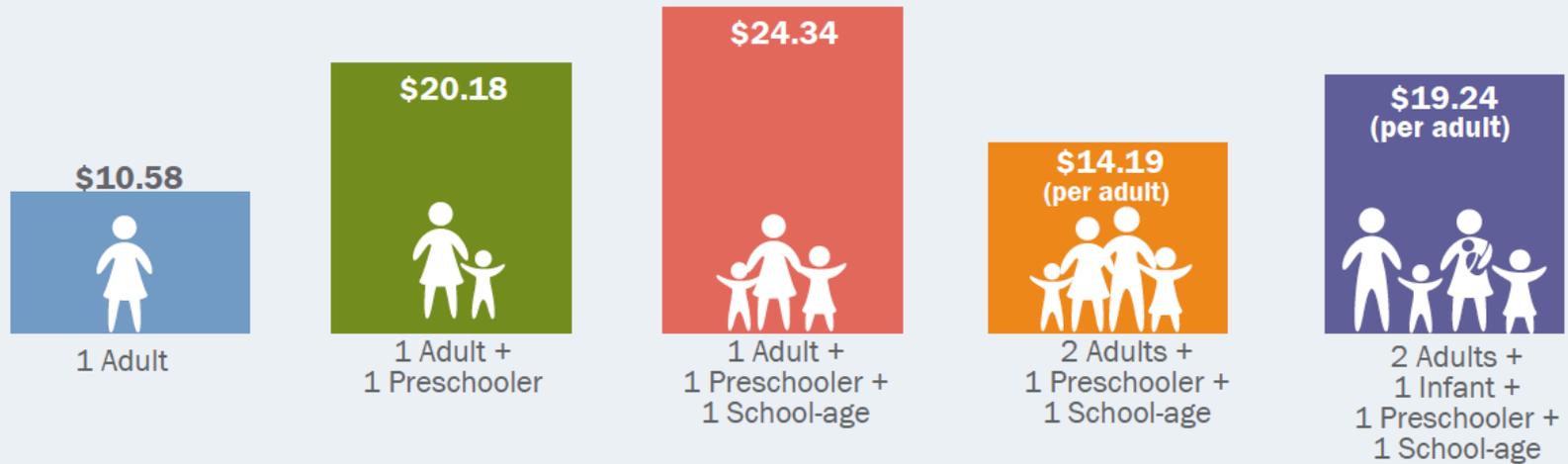
The Self-Sufficiency Standard calculates how much income families of various compositions need to make ends meet without *public or private assistance*, varied by county.

THE SELF-SUFFICIENCY STANDARD VARIES BY COUNTY





THE SELF-SUFFICIENCY STANDARD VARIES BY FAMILY TYPE



Hourly Self-Sufficiency Wage in Macomb County

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SELF-SUFFICIENCY STANDARD

Housing and child care account for almost half of the family budget in the Standard



Ingham County

2 adults + 1 infant + 1 preschooler

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FIGURE B. Percentage of Standard Needed to Meet Basic Needs for Three Family Types*
Ingham County, MI 2017

MONTHLY EXPENSES

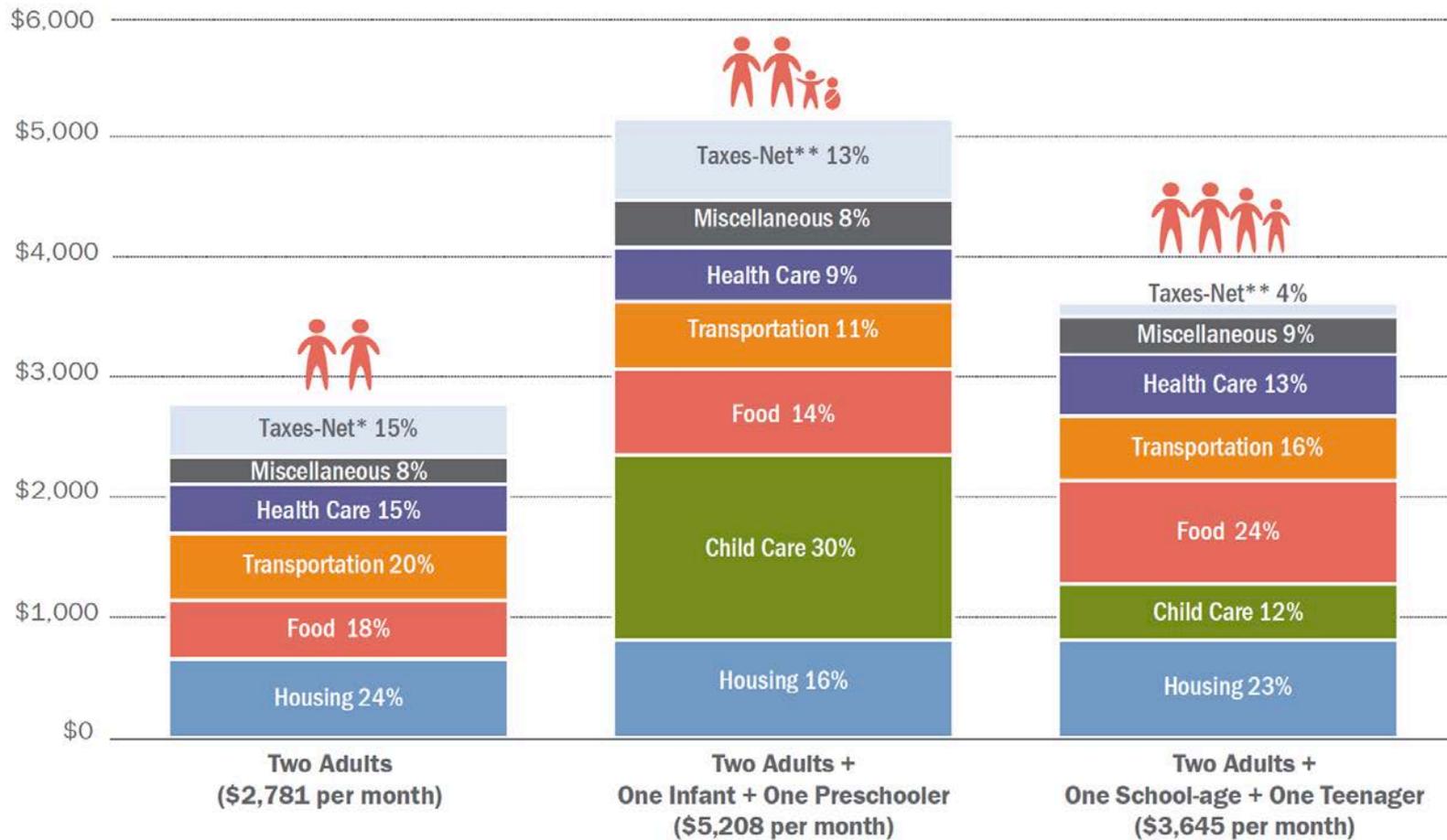
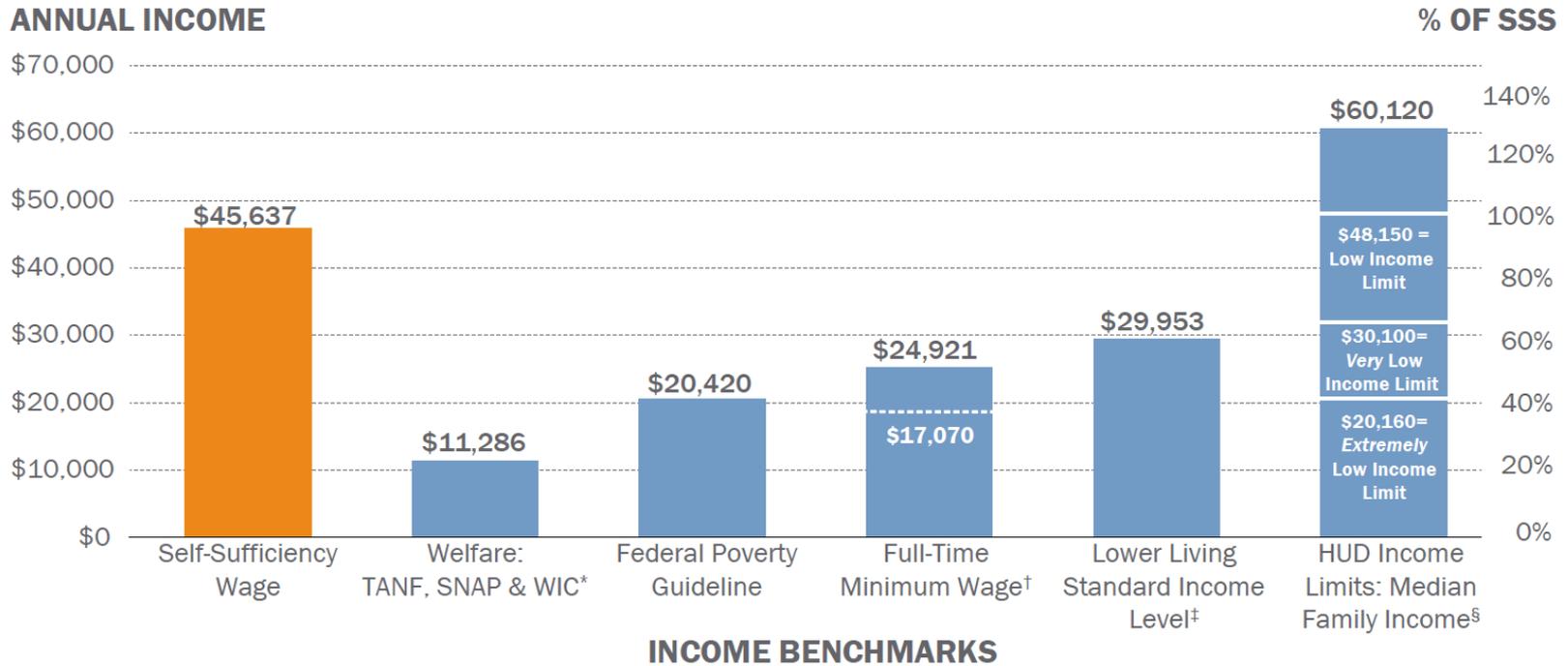


FIGURE D. The Self-Sufficiency Standard Compared to Other Benchmarks
One Adult, One Preschooler, and One School-Age Child: Kent County, MI 2017



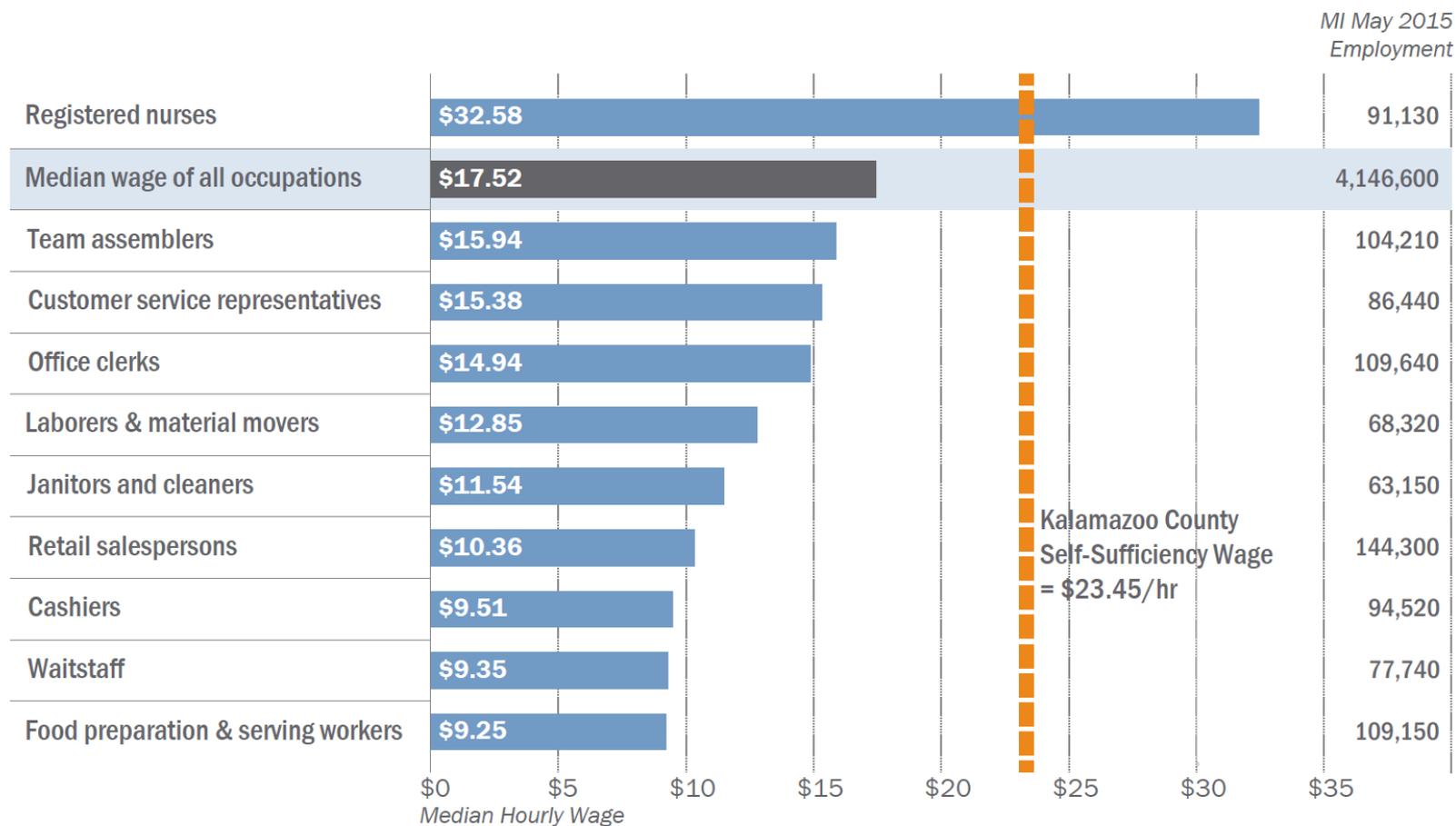
* For FY 2017, the maximum Temporary Assistance for Needy Families (TANF) benefit amount is \$5,904 annually, the Supplemental Nutrition Assistance Program (SNAP) benefit amount is \$4,926 annually, and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) benefit amount is \$478 annually for a family of three in Michigan.

† The Michigan minimum wage is \$8.90 per hour as of January 1, 2017. This amounts to \$18,797 per year; however, assuming this family pays federal and state taxes and receives tax credits, the net yearly income would be a larger amount, \$24,921 as shown. The dashed line shows the annual income received after accounting for taxes (\$17,070) but without the addition of tax credits, which are received as a yearly lump sum after filing taxes the following year.

‡ The U.S. Department of Labor, Employment and Training Administration used the Lower Living Standard Income Level (LLSIL) to define low income individuals for eligibility purposes. The LLSIL is the 2016 adjusted metropolitan Midwest region for a three-person family.

§ The U.S. Department of Housing and Urban Development (HUD) uses area median family income as a standard to assess families' needs for housing assistance. The HUD median family income limits are for FY 2016.

FIGURE E. Hourly Wages of Michigan's Ten Largest Occupations Compared to the Self-Sufficiency Standard One Adult, One Preschooler, & One School-age Child: Kalamazoo County, MI 2017



Source: U.S. Department of Labor, "May 2015 State Occupational Employment and Wage Estimates," Databases and Tables, Occupational Employment Statistics, <http://www.bls.gov/oes/data.htm> (accessed February 14, 2017). Wages adjusted for inflation using the Employer Cost Index from the Bureau of Labor Statistics.

HOW DO WORK SUPPORTS HELP FAMILIES MEET BASIC NEEDS?



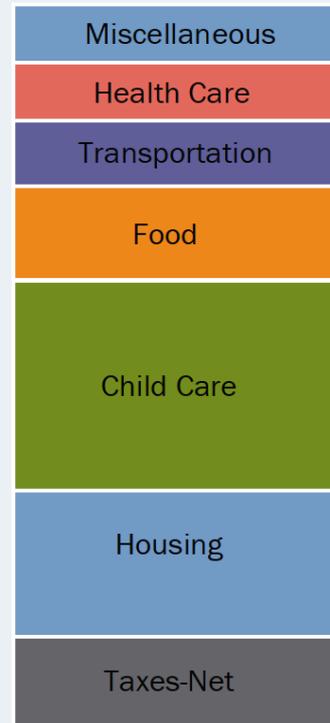
Wayne County

1 adult + 1 preschooler + 1 school-age

This figure shows how work supports can reduce a family's expenses, so they can get by on a lower wage until they are able to earn Self-Sufficiency Wages.

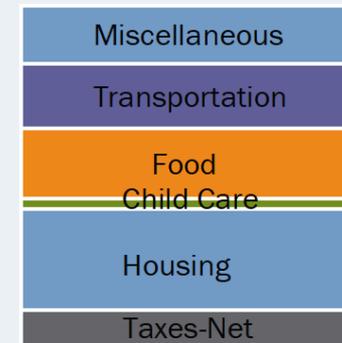
- Medicaid reduces health care costs from \$340 to \$0 per month.
- Food assistance reduces groceries from \$548 to \$408 per month.
- Child care voucher reduces child care costs from \$1,223 to just \$60 copay per month.
- A housing voucher reduces costs from \$878 to \$585 per month (30% of income).
- Taxes (net of tax credits) decrease from \$524 to \$213 per month.

Monthly Expenses = \$4,227
Wage needed = \$24.02 per hour



WITH NO WORK SUPPORTS

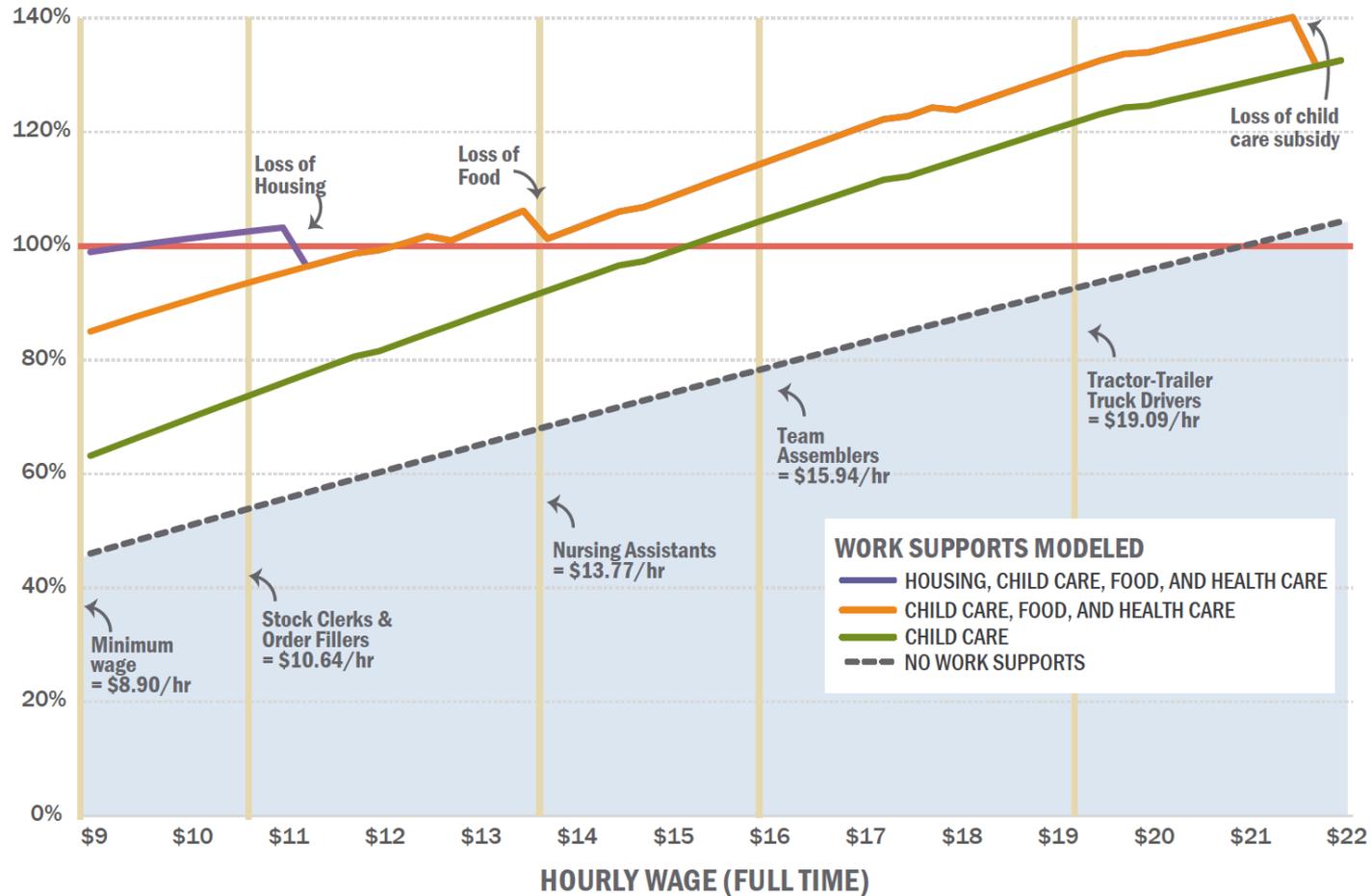
Monthly Expenses = \$1,981
Wage needed = \$11.25 per hour



WITH WORK SUPPORTS

FIGURE G. Impact of Wage Adequacy on Work Supports, Genesee County, MI 2017
One Adult, One Preschooler, & One School-Age Child

PERCENTAGE OF WAGE ADEQUACY



Source: U.S. Department of Labor, "May 2015 State Occupational Employment and Wage Estimates," Databases and Tables, Occupational Employment Statistics, <http://www.bls.gov/oes/data.htm> (accessed October 3, 2016). Wages adjusted for inflation using the Employer Cost Index from the Bureau of Labor Statistics.

FIGURE I. Impact of Education on Median Earnings by Gender, MI 2017

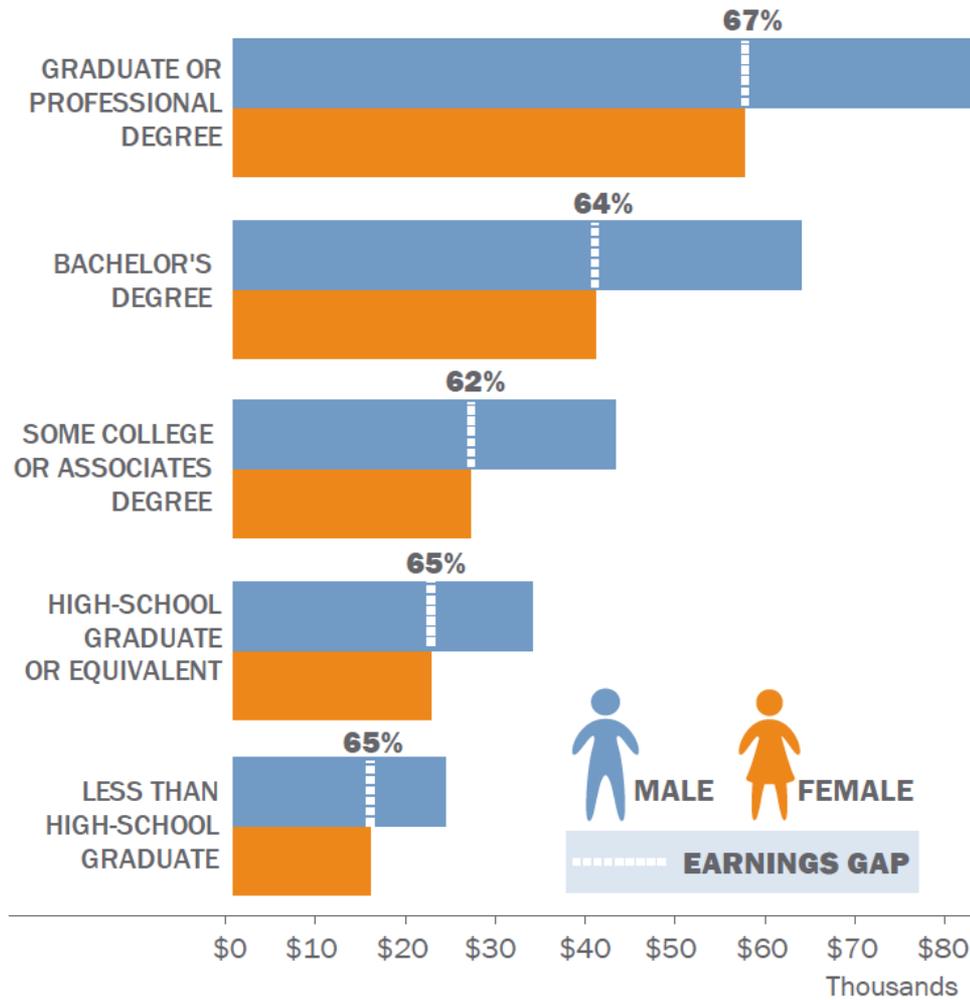
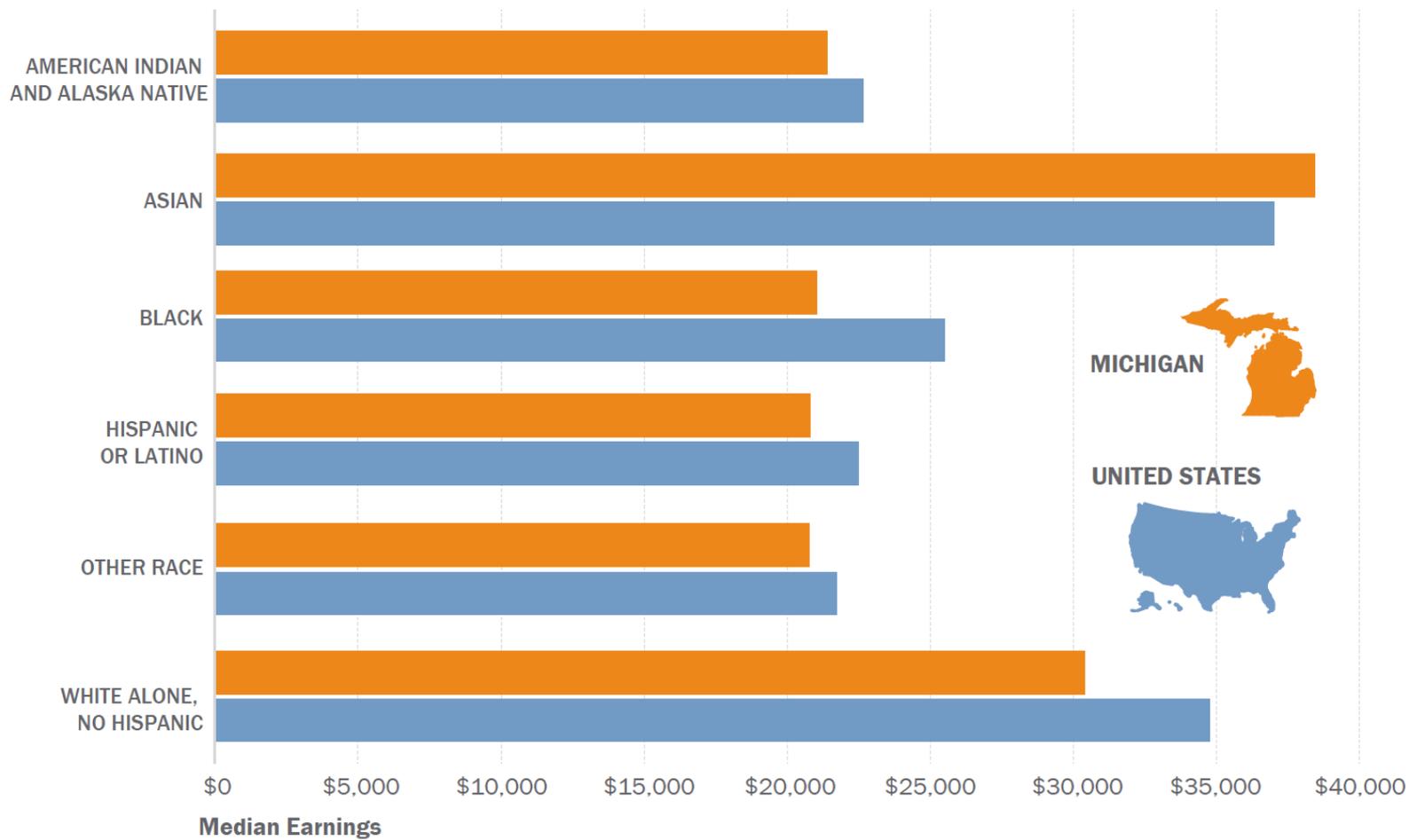


FIGURE J. Impact of Race on Median Earnings, MI and USA 2017





Visit

<https://www.fbcmich.org/selfsufficiencystandard>

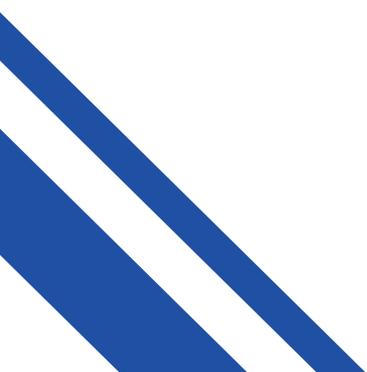
to view the study, data and an interactive table!

Thank you!



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2018 Kids Count in Michigan

Michigan Learning Connection Summit



Alicia Guevara Warren
Kids Count Project Director
aliciagw@mlpp.org

May 2, 2018





The League's Mission

To advance economic security, racial equity, health and well-being for all people in every part of Michigan through policy change.

1223 Turner St. Suite G-1, Lansing, MI 48906-4369 • (517) 487-5436
Fax: (517) 371-4546 • Web site: www.mlpp.org

A United Way Agency

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**kids
count**
in Michigan

Kids Count in Michigan

Goals:

- Measure child well-being at the state and local levels
- Use that information to shape public policies and programs
- Improve the lives of children and their families

Tools:

- County-level profiles
- Data Center
- State and national reports

Frames:

- Race, place and income matter
- Two-generation approaches

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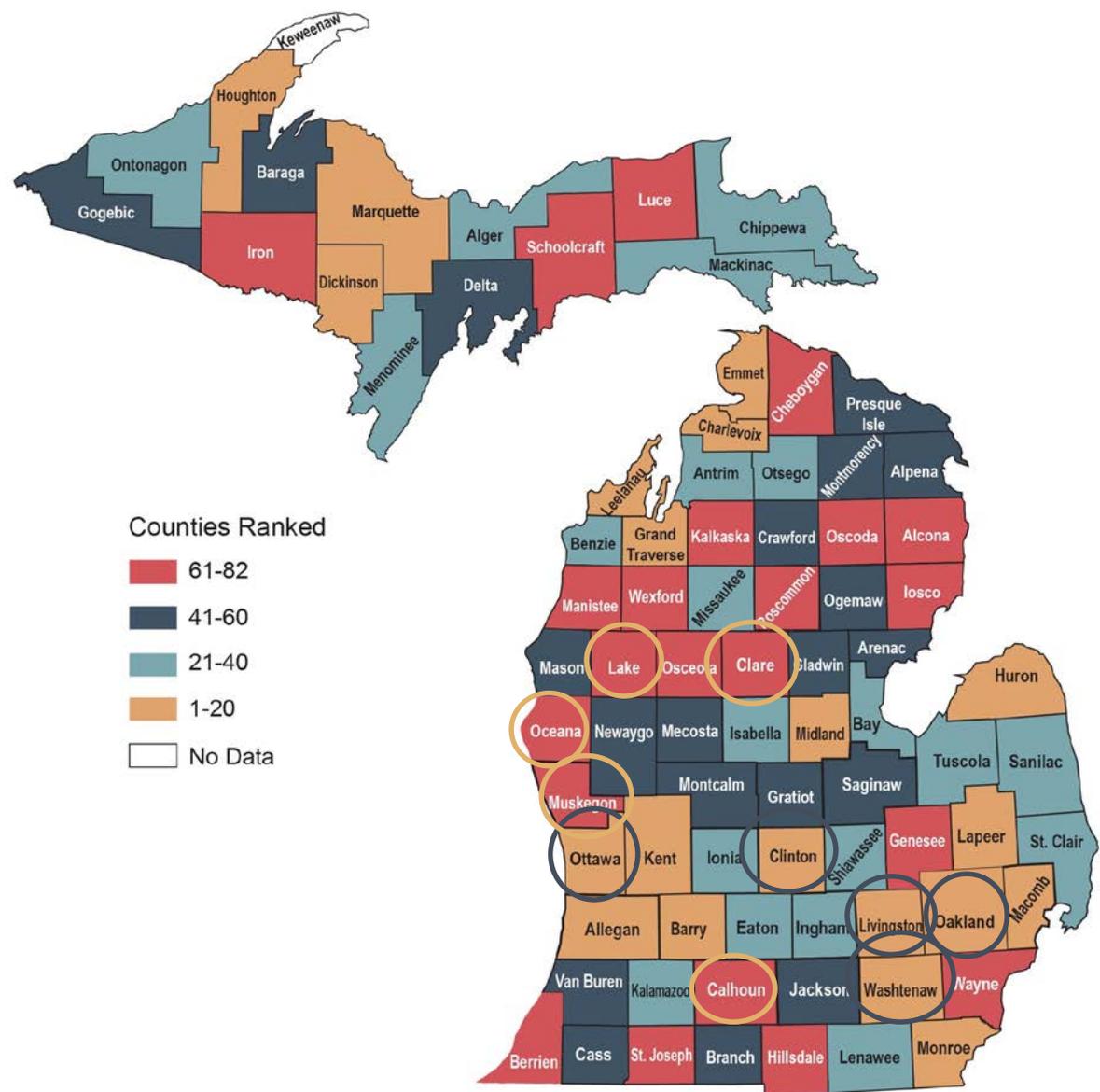


2018
MICHIGAN
DATA
BOOK

CHILD
WELL-BEING
TRENDS

2010-2016

	BASE YEAR		CURRENT YEAR		
	NUMBER	RATE	NUMBER	RATE	RATE CHANGE
ECONOMIC SECURITY	<u>2010</u>		<u>2016</u>		
Children in poverty, ages 0–17	537,003	23.4%	444,100	20.7%	-11.5%
Young children, ages 0–5, in the Food Assistance Program ¹	276,498	37.2%	192,782	28.0%	-24.8%
Students receiving free/reduced-price school lunches ²	<u>2009–10 (SY)</u>		<u>2016–17 (SY)</u>		
	735,401	45.8%	679,211	45.8%	0.0%
HEALTH	<u>2008–10 (avg.)</u>		<u>2013–15 (avg.)</u>		
Less than adequate prenatal care	34,838	29.6%	36,911	32.4%	9.5%
Low-birthweight babies	9,957	8.5%	9,533	8.4%	-0.6%
Infant mortality (per 1,000)	864	7.3	781	6.9	-6.0%
Child/Teen deaths, ages 1–19 (per 100,000)	704	27.7	604	25.3	-8.7%
FAMILY AND COMMUNITY (per 1,000)	<u>2008–10 (avg.)</u>		<u>2013–15 (avg.)</u>		
Births to teens, ages 15–19	11,523	31.9	7,063	21.4	-33.0%
<u>Child abuse/neglect</u>	<u>2010</u>		<u>2016</u>		
Children in investigated families	164,648	70.1	248,401	112.5	60.6%
Confirmed victims	32,504	13.8	39,552	17.9	29.5%
Children in out-of-home care	12,004	5.1	10,512	4.8	-6.8%
EDUCATION	<u>2006–10 (avg.)</u>		<u>2012–16 (avg.)</u>		
3- and 4-year-olds not in preschool	133,746	52.9%	124,771	52.7%	-0.5%
Students not graduating on time	<u>2010</u>		<u>2016</u>		
	33,185	24.0%	24,823	20.4%	-15.4%
Students not college ready	<u>2016</u>		<u>2017</u>		
	67,878	65.1%	68,944	65.1%	0.0%
<u>Not proficient (M-STEP)</u>	<u>2015–16 (SY)</u>		<u>2016–17 (SY)</u>		
Third-graders (English Language Arts)	53,535	49.9%	58,277	55.9%	12.0%
Eighth-graders (Math)	75,854	67.8%	72,657	66.5%	-1.9%



OVERALL CHILD WELL-BEING RANKED

Counties Ranked

- 61-82
- 41-60
- 21-40
- 1-20
- No Data

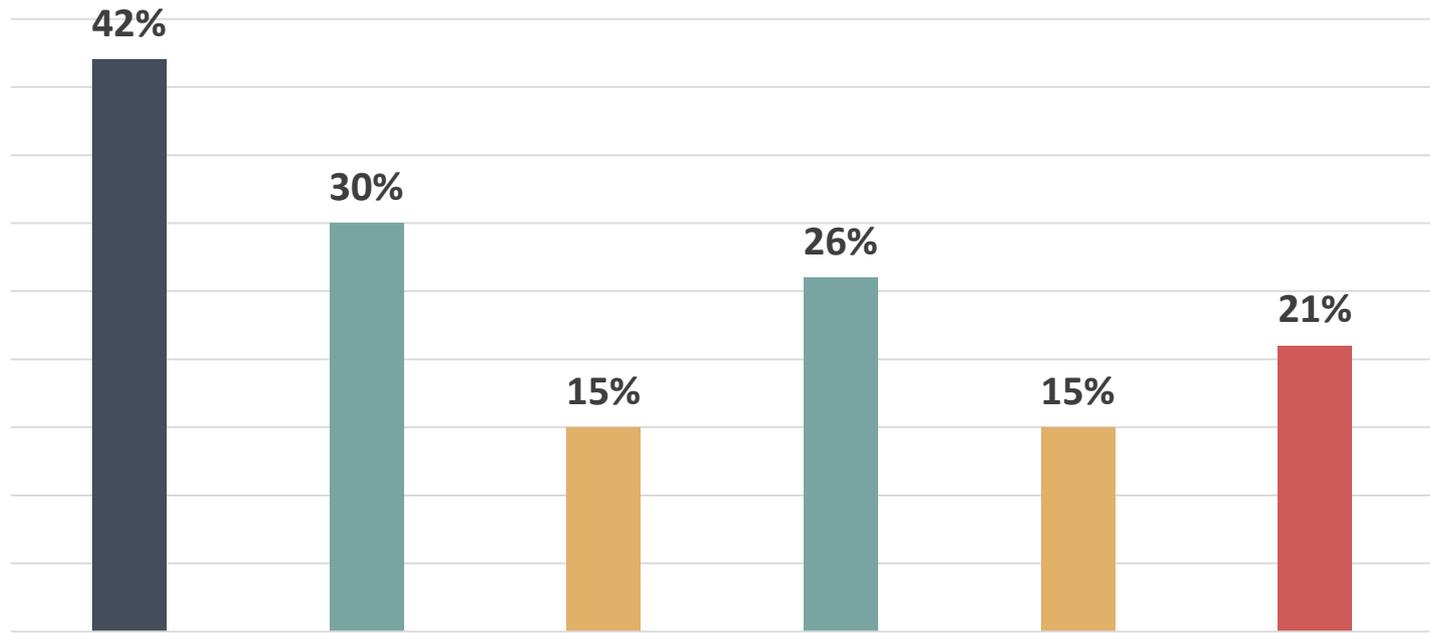
1. Livingston	11. Charlevoix	21. Eaton	30. Menominee	41. Gratiot	51. Mecosta	61. Cheboygan	72. Luce
2. Clinton	12. Marquette	22. Ionia	32. Antrim	42. Mason	52. Newaygo	62. Oscoda	73. Kalkaska
3. Ottawa	13. Lapeer	22. Otsego	33. Chippewa	43. Presque Isle	53. Branch	63. Berrien	74. Alcona
4. Oakland	14. Monroe	24. Lenawee	34. Alger	44. Montcalm	54. Gogebic	64. Wayne	75. Iosco
5. Washtenaw	15. Macomb	25. Sanilac	35. Tusola	45. Saginaw	55. Van Buren	65. Osceola	76. Manistee
6. Emmet	16. Barry	26. Isabella	36. Bay	46. Baraga	56. Montmorency	66. Hillsdale	77. Iron
7. Leelanau	17. Allegan	27. St. Clair	37. Missaukee	47. Arenac	57. Gladwin	66. Roscommon	78. Oceana
8. Midland	18. Huron	28. Shiawassee	38. Kalamazoo	48. Cass	58. Jackson	66. Wexford	79. Calhoun
9. Houghton	18. Kent	29. Ontonagon	39. Mackinac	49. Delta	59. Crawford	69. St. Joseph	80. Muskegon
10. Grand Traverse	20. Dickinson	30. Benzie	40. Ingham	50. Alpena	60. Ogemaw	70. Schoolcraft	81. Clare
						71. Genesee	82. Lake

ECONOMIC SECURITY



Key Findings: Economic Security

CHILD POVERTY



African American/Black

Hispanic/Latinx

Asian and Pacific Islander

Two or more races

White

Total

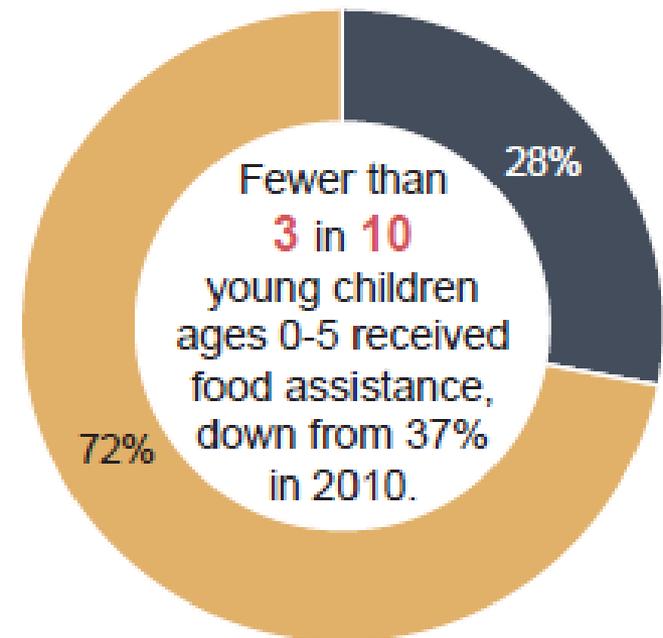
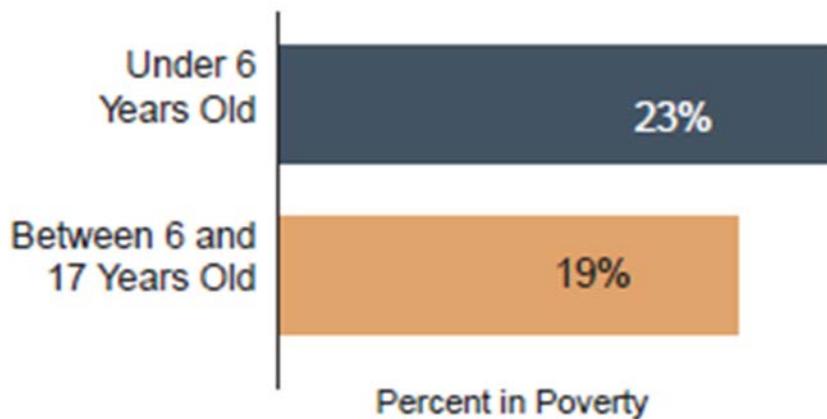
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Key Findings: Economic Security

CHILD POVERTY

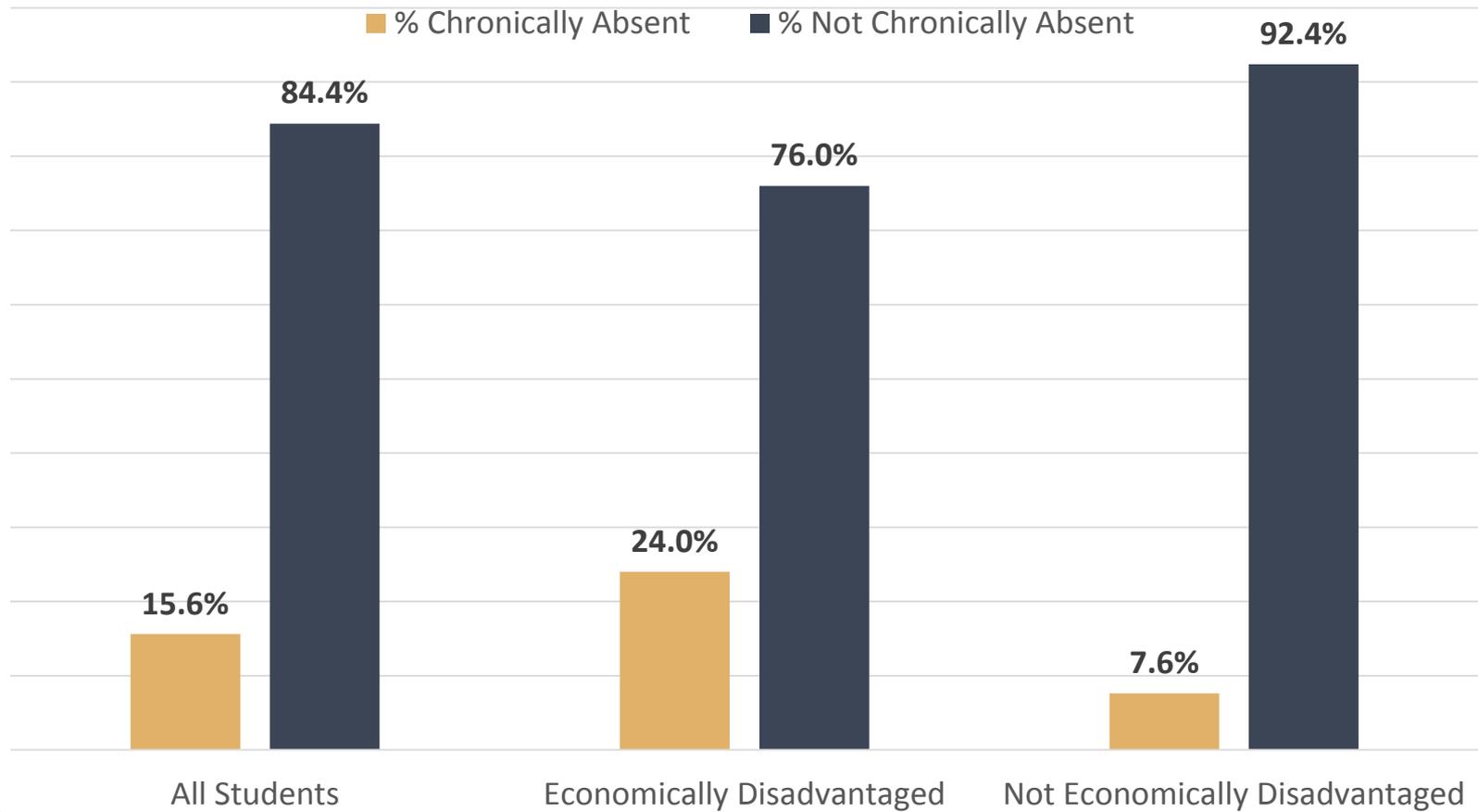


EDUCATION



Key Findings: Education

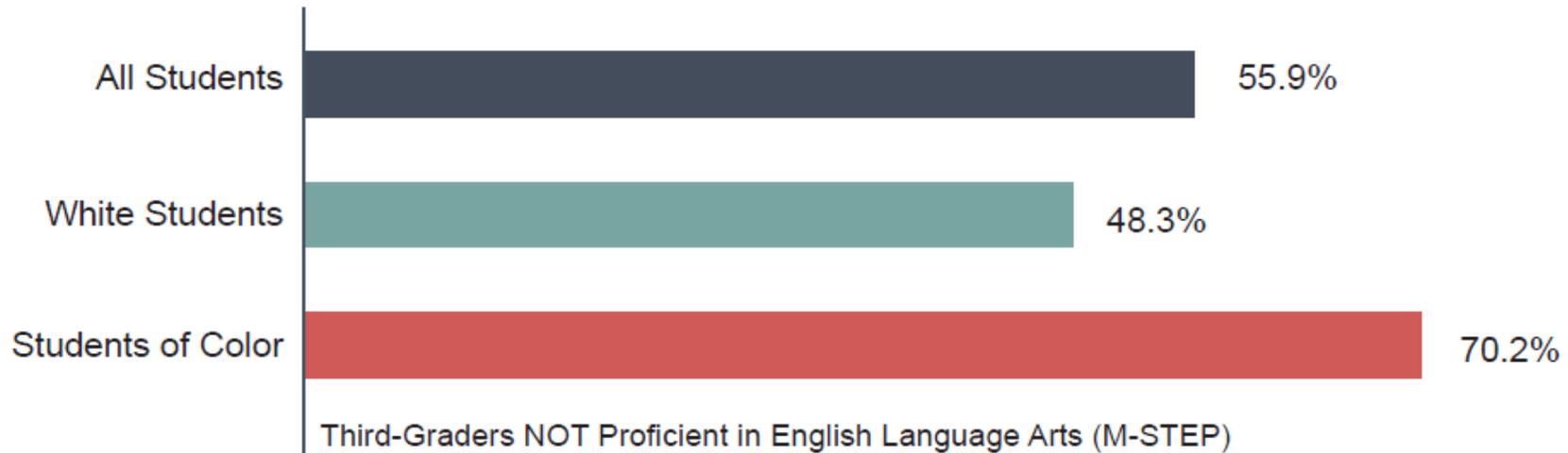
CHRONIC ABSENTEEISM



SY 2016-2017

Key Findings: Education

EARLY CARE & EDUCATION

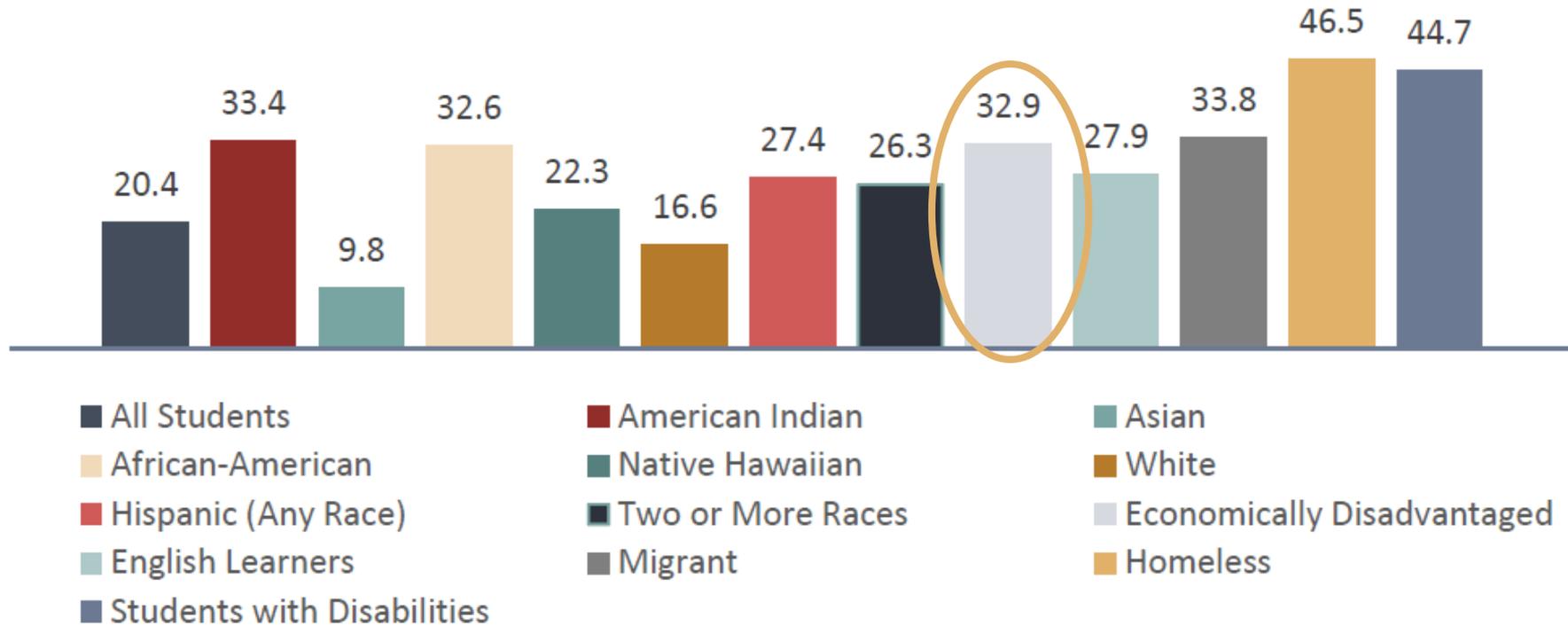


7 in 10 third-graders from economically disadvantaged families are not proficient in reading

Key Findings: Education

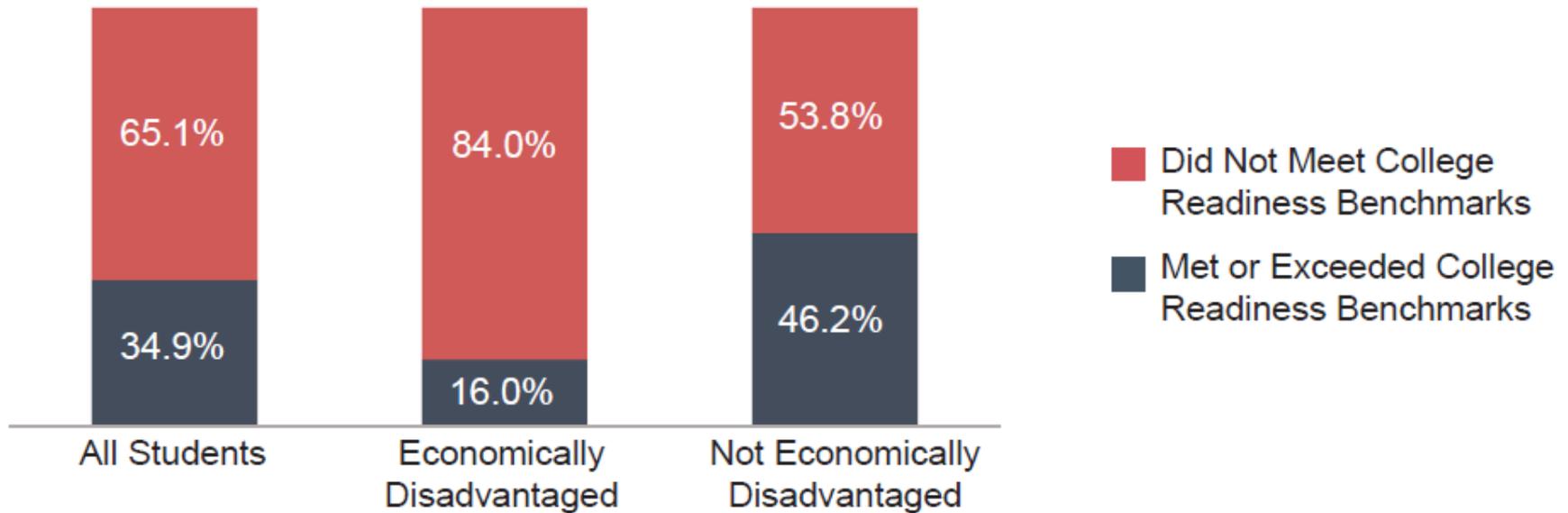
ON-TIME GRADUATION

Percent NOT
Graduating on Time



Key Findings: Education

COLLEGE READINESS



Need additional data?

County profiles from the data book:

www.mlpp.org

KIDS COUNT Data Center includes Michigan, county, city and township, and Congressional districts:

www.datacenter.kidscount.org

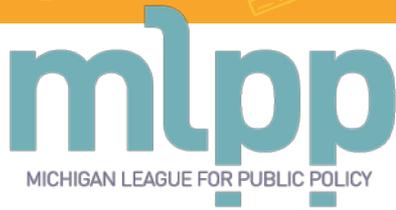
KIDS COUNT DATA CENTER datacenter.kidscount.org

Hundreds of child well-being indicators at your fingertips to encourage policies and support smart decisions for children and families.

1 SEARCH
Enter any location, topic or keyword into the powerful search engine to find the statistics most relevant to your community.

2 VISUALIZE
Create custom profiles
Create maps
Create line graphs
Create bar charts

3 SHARE
Post data visualizations on Facebook, add custom graphics to Tumblr and tweet about how the well-being of your state's children compares with the region and nation.



Questions?

aliciagw@mlpp.org

Website: www.mlpp.org

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Become a member



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Second Chance Breakfast



Coopersville, MI

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Breakfast Menu

- Cart 1: Yogurt parfaits
- Cart 2: Cereal (Frosted Mini-Wheats, Rice Chex), [Overnight Oats](#)
- Cart 3 & 4: Egg & Cheese Sandwich, Huevos [Rancheros](#)
- Cart 5: Grab n' Go with cheese stick, apple and muffin
- Fruit and milk also available

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Thank you to our Vendors

- Acosta-Cornerstone
- Cold Sell
- Hubert

ACOSTA | CORNERSTONE

COLD  **SELL**®

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Worldwide Excellence in Food Merchandising

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- Success Stories from Michigan



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Pontiac Academy for Excellence Elementary School

Breakfast in the Classroom

Dr. Thursenia DeHart-Jones,
Principal



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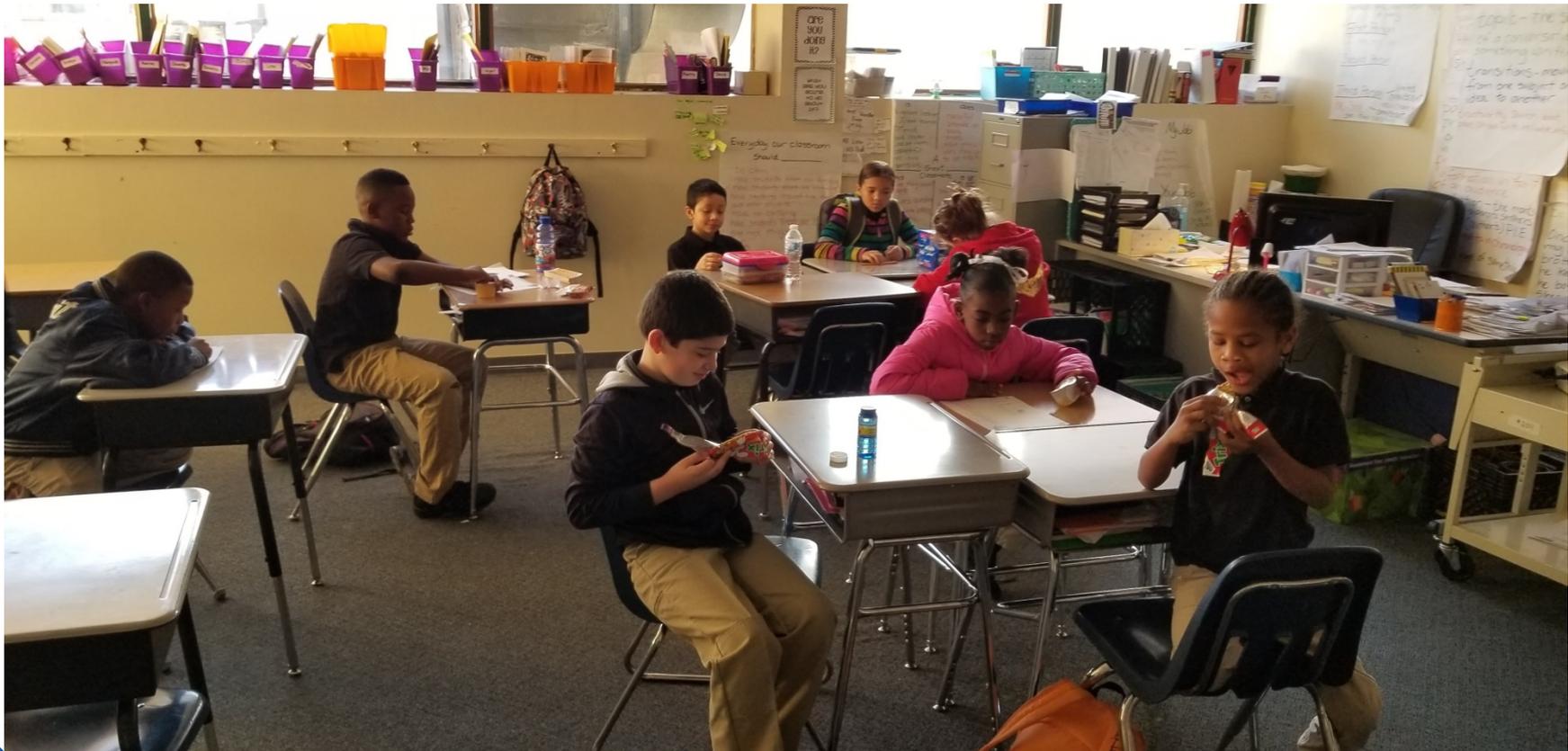


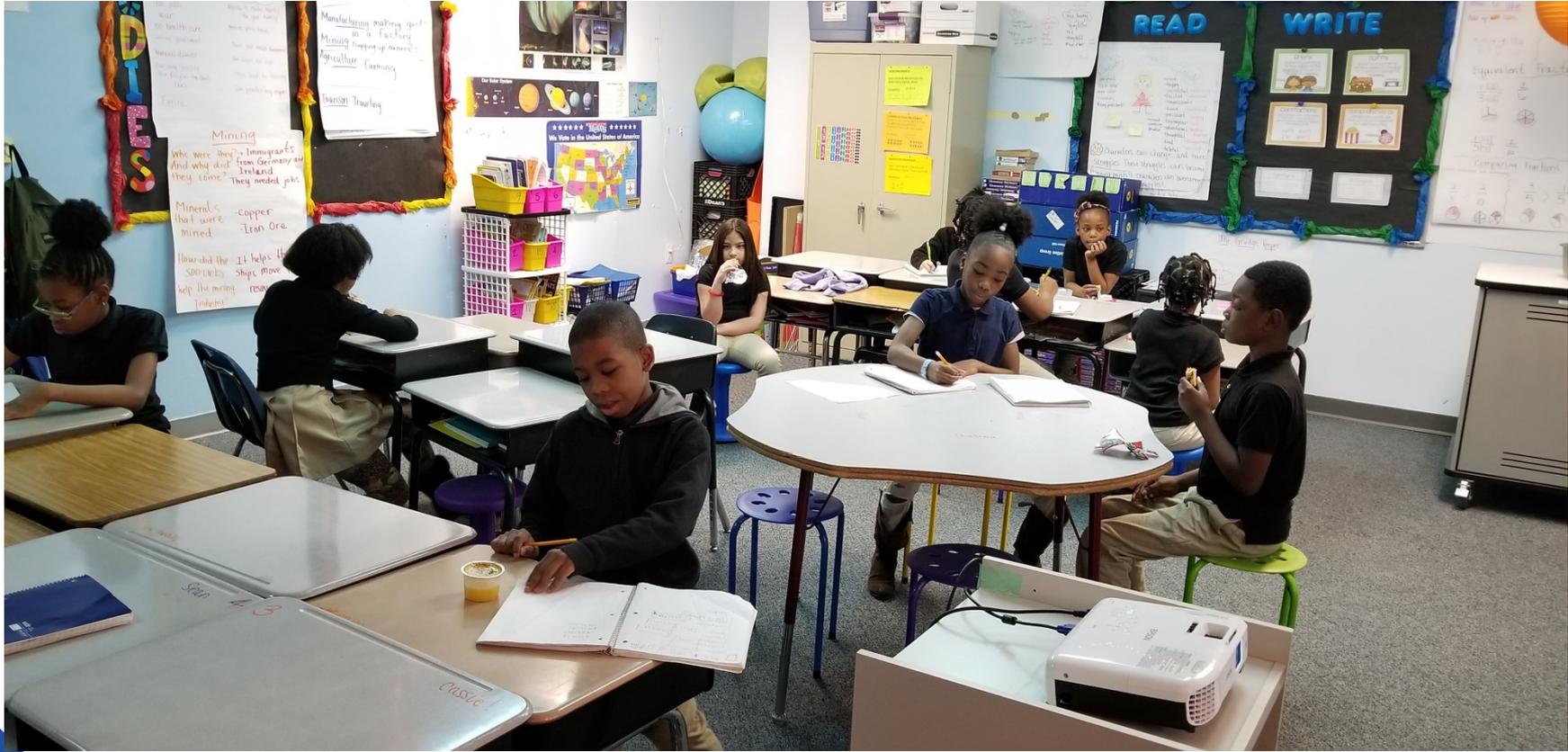




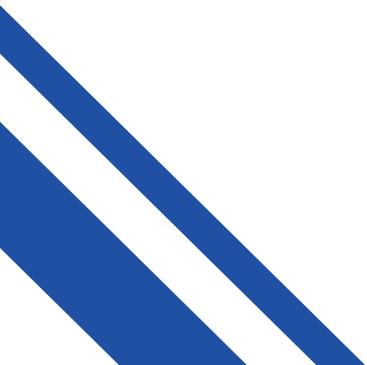
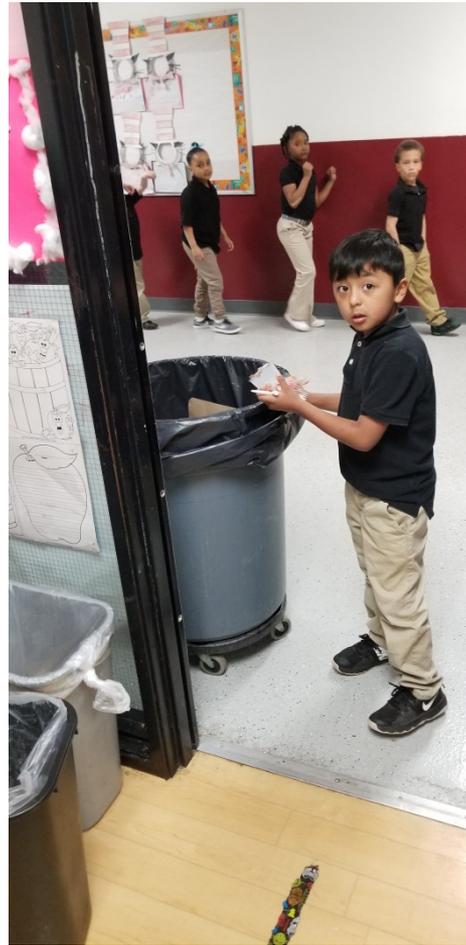














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John Severson, PhD

Superintendent

Muskegon Area Intermediate School District



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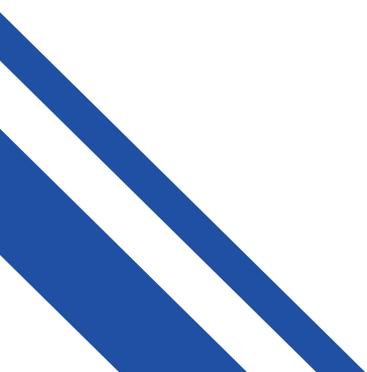
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- United Way video



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The Effects of Exercise, Obesity, and Nutrition on Cognition in Children



Lauren Raine Ph.D.
Postdoctoral Research Associate
Center for Cognitive and Brain Health
Department of Psychology, Northeastern University
Interdisciplinary Science & Engineering Complex



Objectives

- To emphasize the role of physical activity and aerobic fitness on cognitive health and academic achievement
- To highlight research studies examining the deleterious effects of obesity on cognitive and brain health
- To identify dietary components associated with memory and cognitive control in childhood

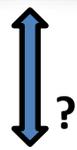


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Physical Activity & Fitness



Cognitive Function



Nutrition



Obesity & Adiposity



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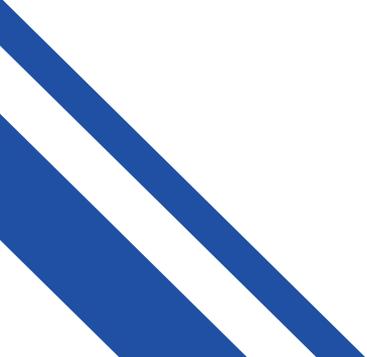


PHYSICAL ACTIVITY & FITNESS



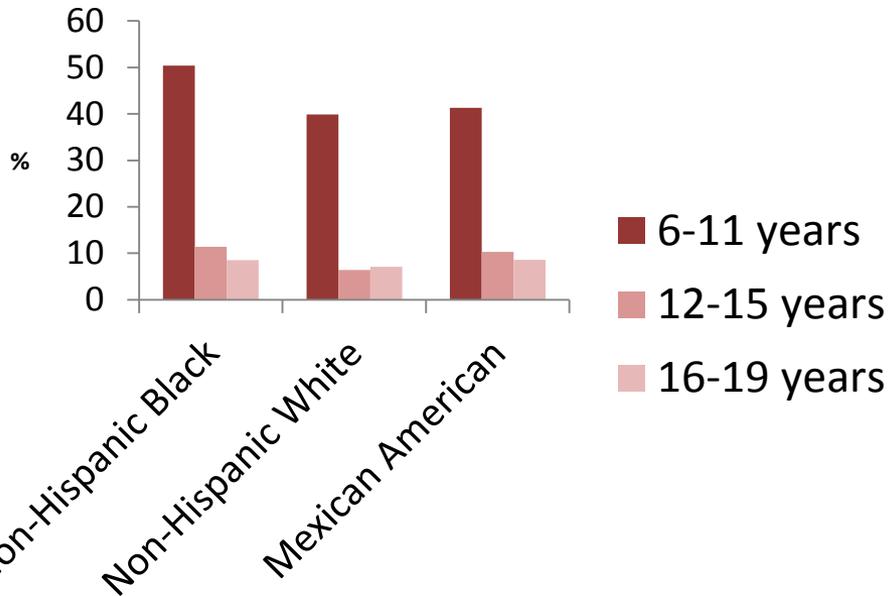
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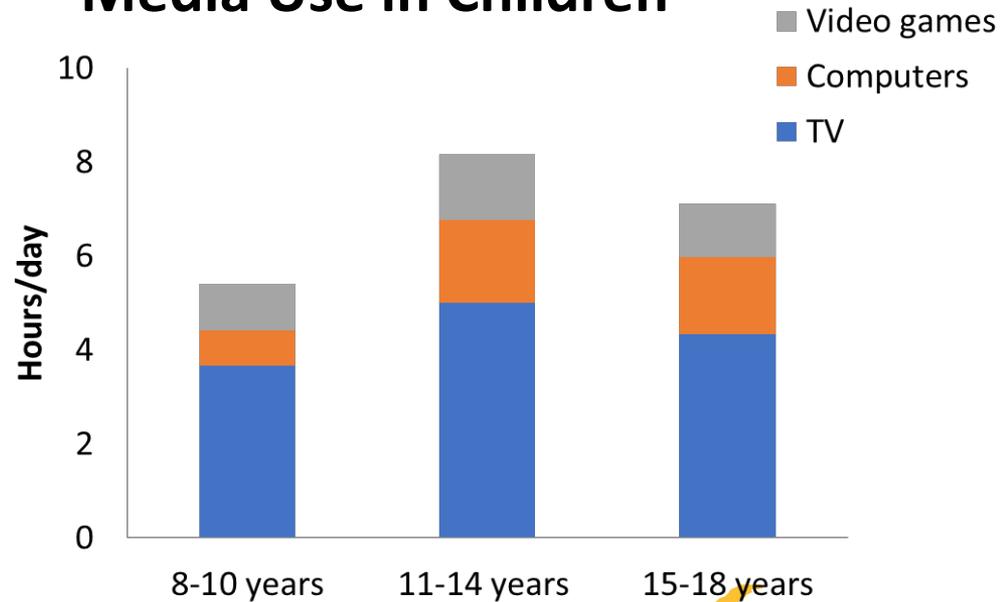
Childhood Behaviors

% Children Meeting Daily PA Recommendations



Whitt-Glover et al. (2009). *JPHP*, 30, S309-S334.

Media Use in Children



Kaiser Foundation Media Study (2010)

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Children are becoming increasingly sedentary.



(DHHS & DOE, 2000)



Sedentary Childhood
often leads to
Sedentary Adulthood.



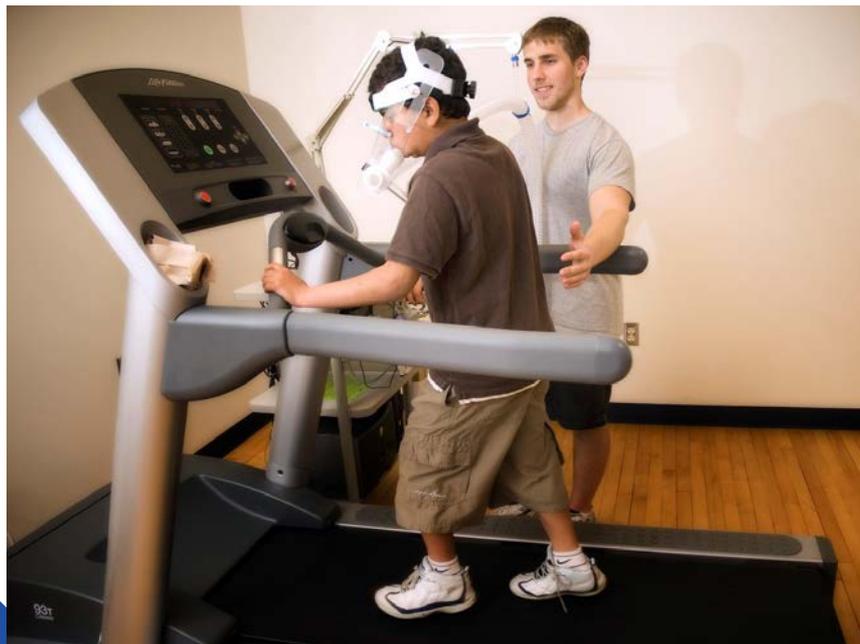
A growing number of schools are **eliminating daily physical activity** opportunities to provide additional classroom time on formal academic topics.





Fitness

VO₂ Max

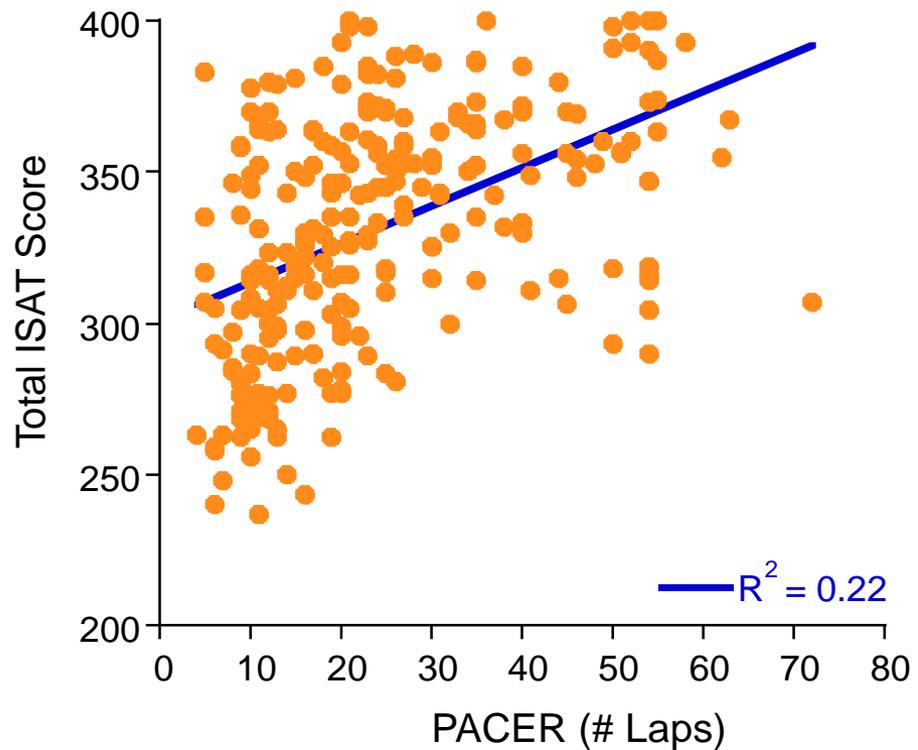
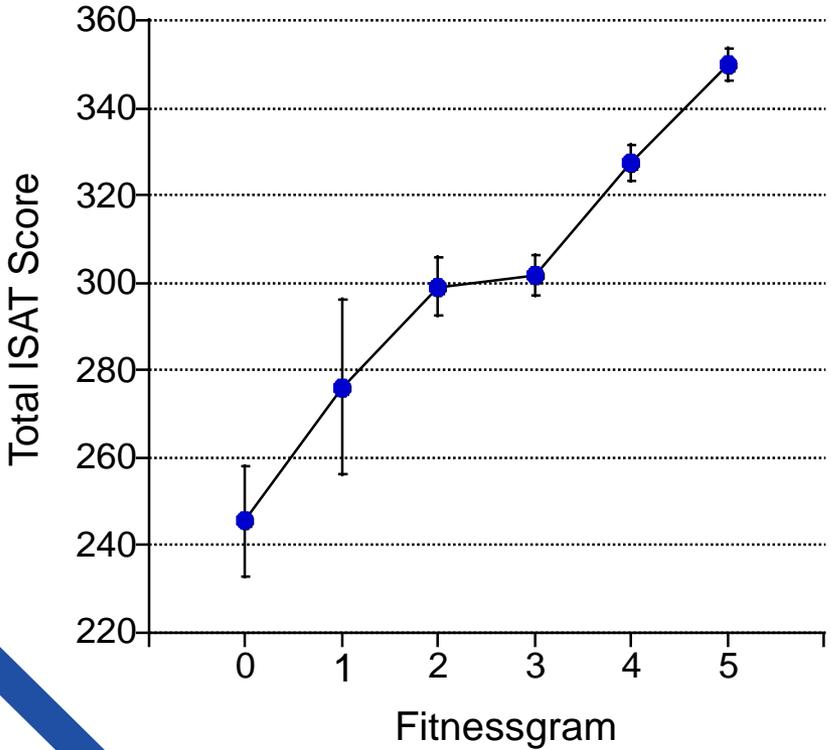


Fitnessgram





Physical Fitness and Achievement



Castelli, Hillman, Buck, & Erwin (2007) *JSEP*.



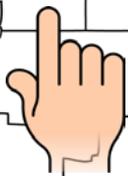
Fitness and Learning

Learning

Study Only

Study: 6 sec

Taft



Test Study

Test: 4 sec

Clay

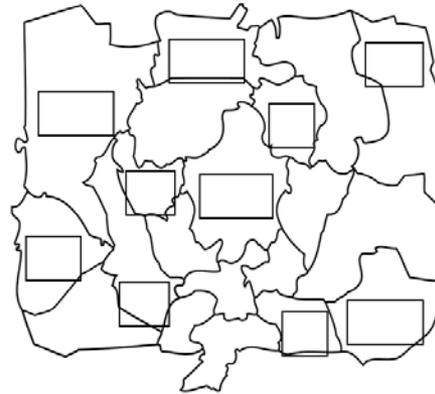


Study: 2 sec

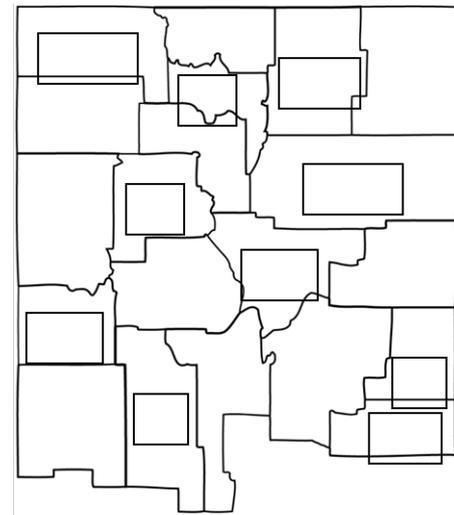


Recall

Free



Cued



Pell Bond Ross Taft Dane
Owen Glen Cass Nash Mack

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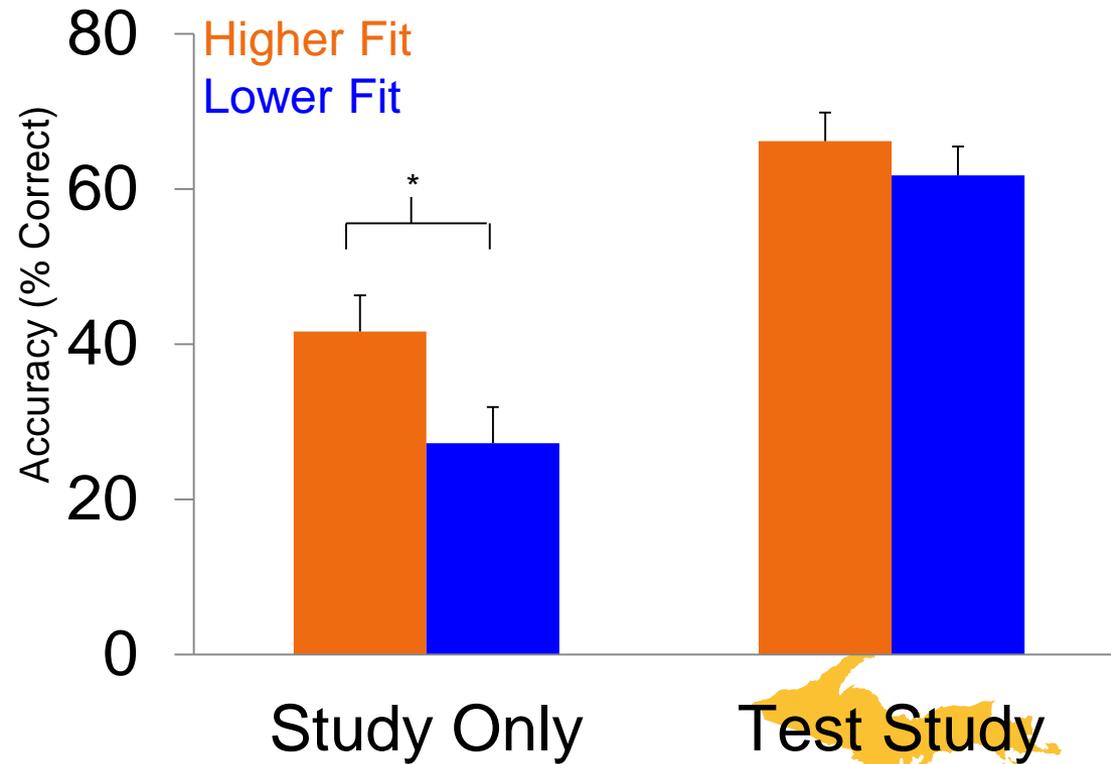


Fitness and Recall

Table 1. Mean (SE) Demographic Information for Higher Fit (HF) and Lower Fit (LF) Groups.

Measure	HF	LF
<i>n</i>	24 (14 female)	24 (12 female)
Age (years)	9.9 (0.1)	9.9 (0.6)
Socioeconomic Status (SES)	2.4 (0.1)	2.1 (0.1)
KBIT (IQ)	120.7 (2.2)	116.4 (1.4)
ADHD	35.0 (5.9)	33.3 (4.1)
VO ₂ max Relative*	51.4 (1.0)	37.3 (0.9)
VO ₂ max Percentile*	82.0 (1.3)	10.5 (1.4)

*Indicates significant difference, $p < 0.05$.
doi:10.1371/journal.pone.0072666.t001



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Cognitive Control



Inhibition

the ability to ignore distraction and stay focused



Working Memory

the ability to hold information in mind and manipulate it



Cognitive Flexibility

the ability to switch perspectives, focus of attention, or response mappings

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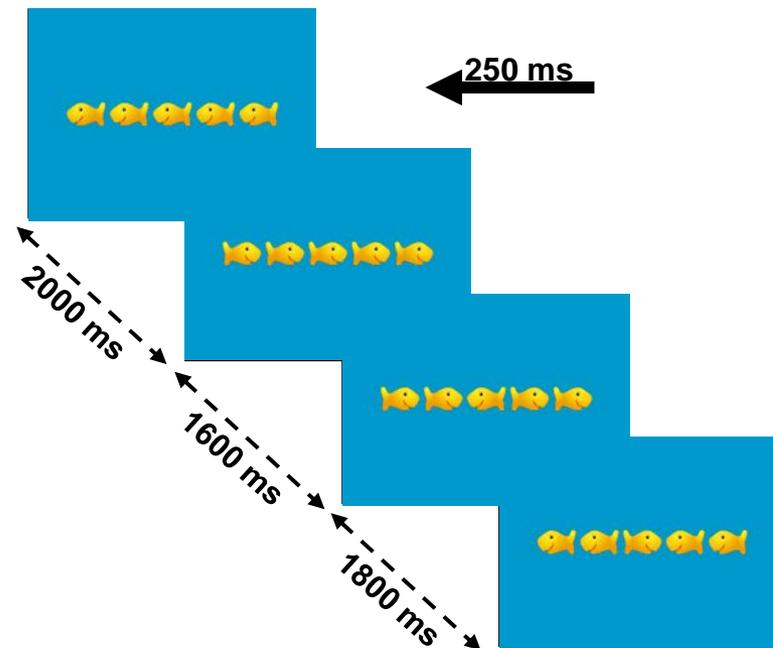


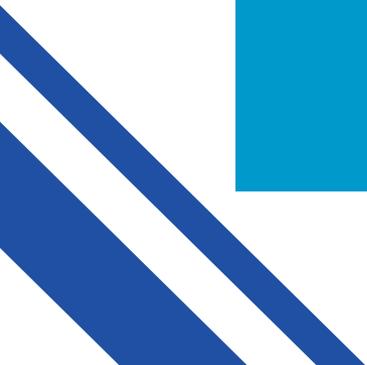


Cognitive Control: Flanker Task



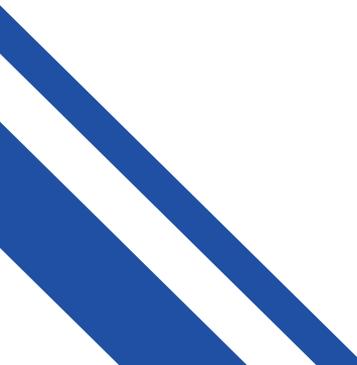
Inhibition
the ability to ignore
distraction & stay
focused







Event-Related Potentials (ERP)



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Fitness and Inhibition

Table 1. Mean (*SD*) Values for Participant Demographics and Fitness Data

<i>Measure</i>	<i>Lower-fit</i>	<i>Higher-fit</i>
<i>n</i>	24 (13 girls)	24 (10 girls)
Age (years)	10.1 (0.6)	10.0 (0.6)
Tanner	1.7 (0.5)	1.7 (0.5)
K-BIT composite (IQ)	113.2 (14.9)	115.3 (8.6)
Socioeconomic Status (SES)	2.8 (0.6)	2.6 (0.7)
ADHD	6.3 (4.7)	6.9 (4.5)
VO ₂ max (ml/kg/min)*	35.7 (5.3)	52.6 (4.2)
VO ₂ max Percentile*	8.8 (5.3)	83.3 (4.1)

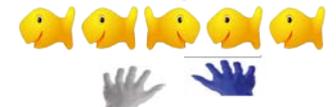


Compatible

Congruen



Incongruent



Incompatible

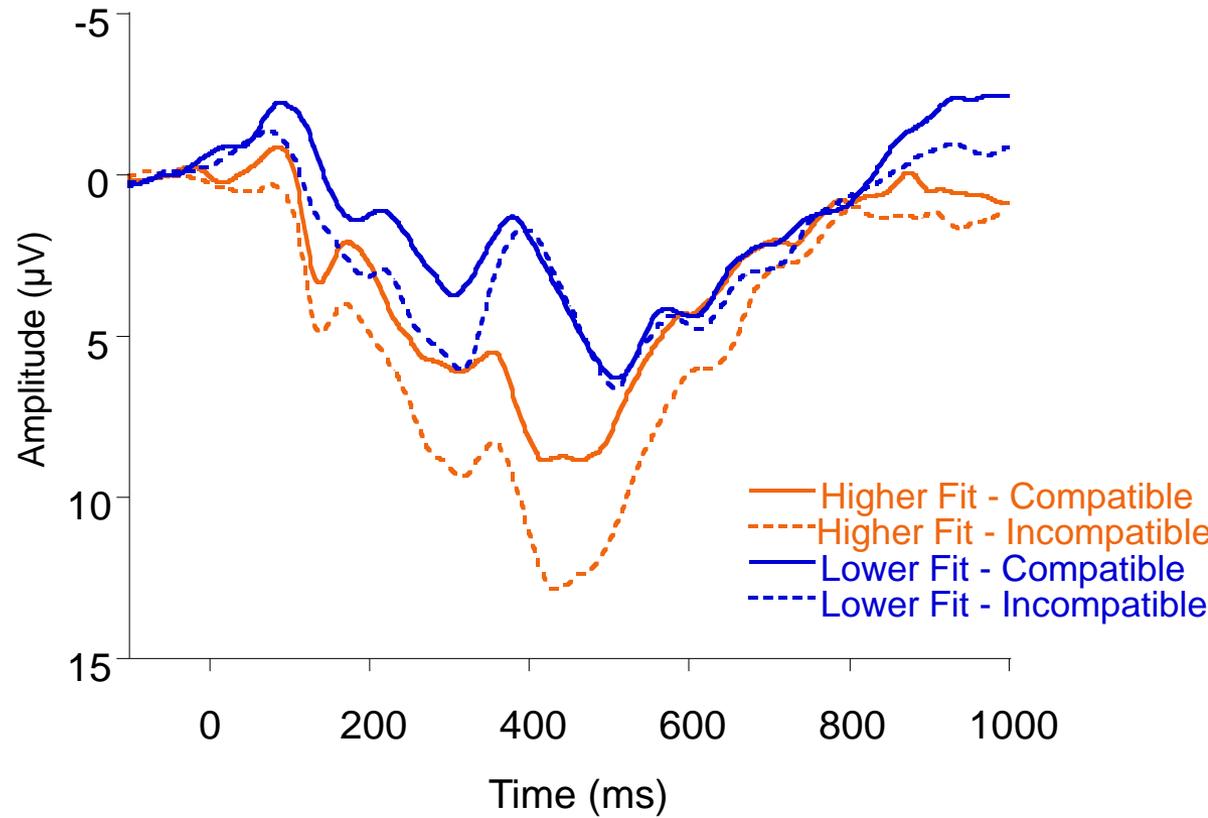
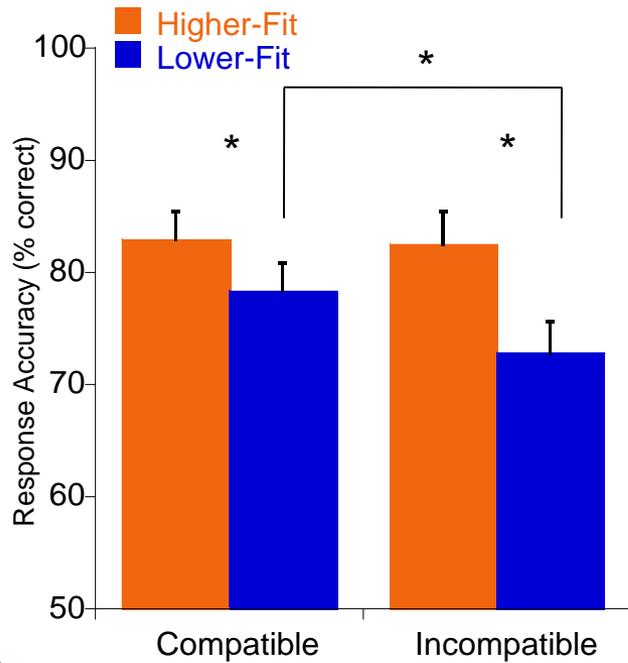
Congruen



Incongruent



Fitness and Inhibition

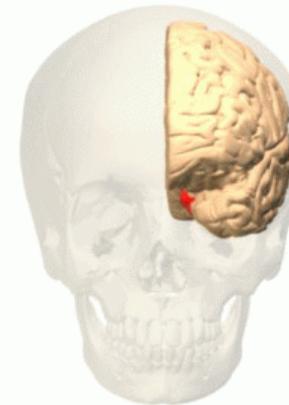
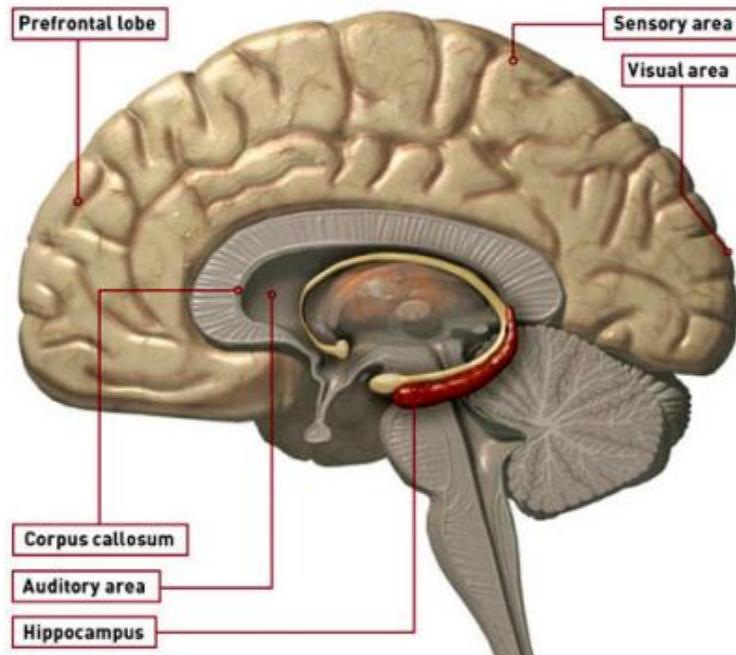


Relational Memory in Children

Relational Memory

Ability to bind together elements of an event/scene and their subsequent expression

Thought to be hippocampal-dependent



Eichenbaum H & Cohen NJ. (2001). Oxford University Press

Fitness and Relational Memory in Children

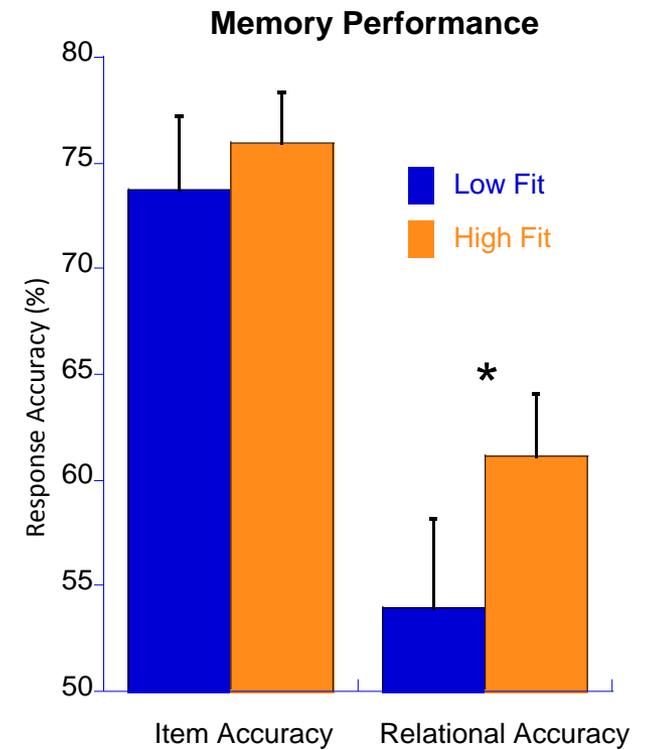
Picture Encoding



Retrieval Task

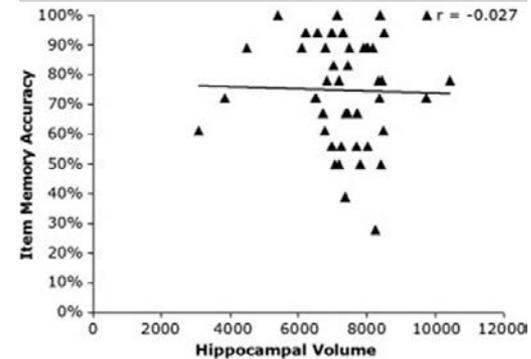
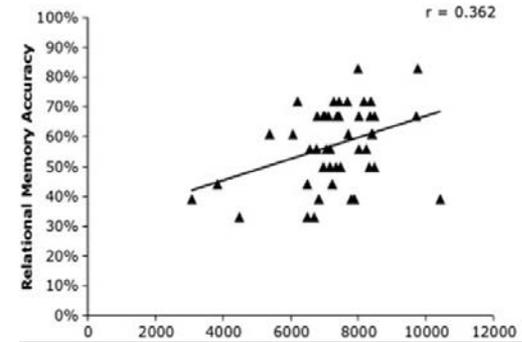
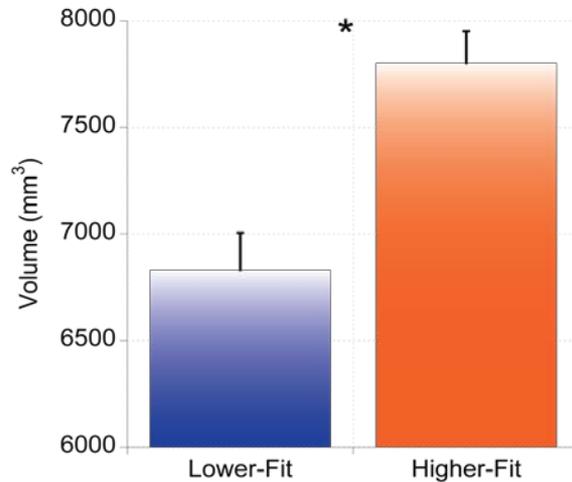
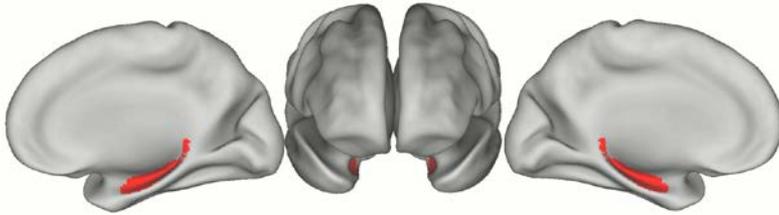


5 minute Delay



Chaddock et al. (2010). *Brain Research*, 1358, 172-183

Fitness, Relational Memory, and the Hippocampus

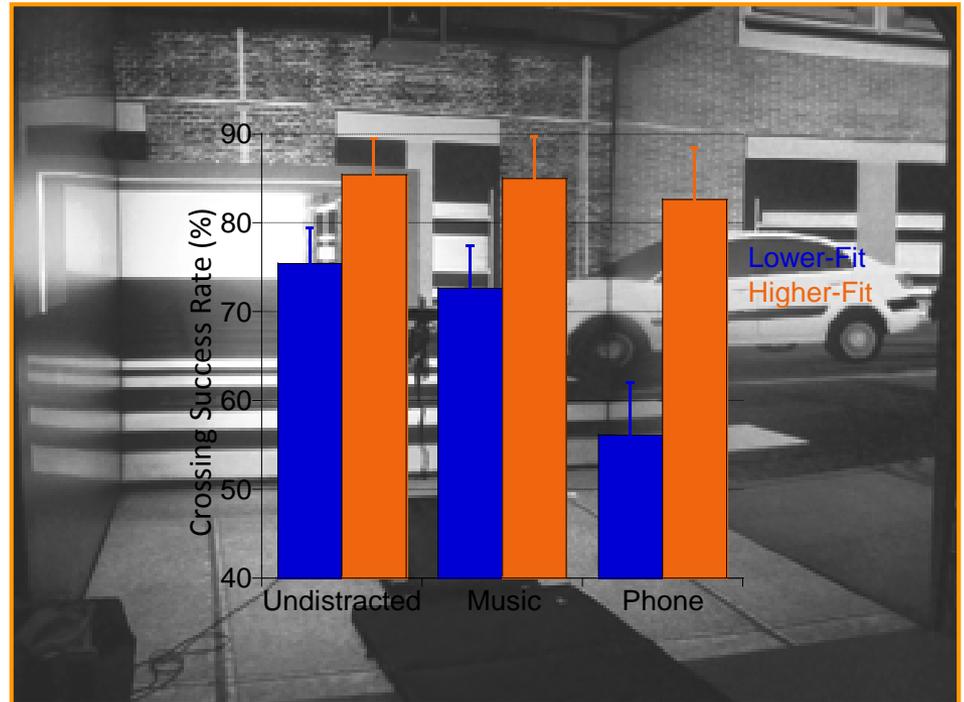


Real World Implications

Why do we care about attention and memory performance in children?

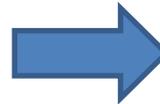
Motor vehicle accidents are among the leading causes of death among children under the age of 16 years in the U.S.

Given the importance of fitness to cognition, might fitness lead to better decision making at the crosswalk?





Acute Exercise

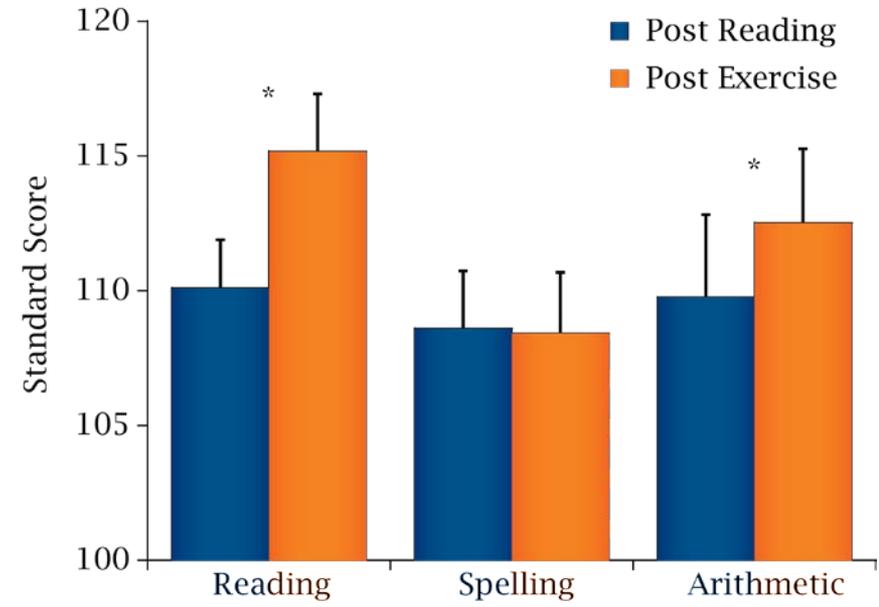
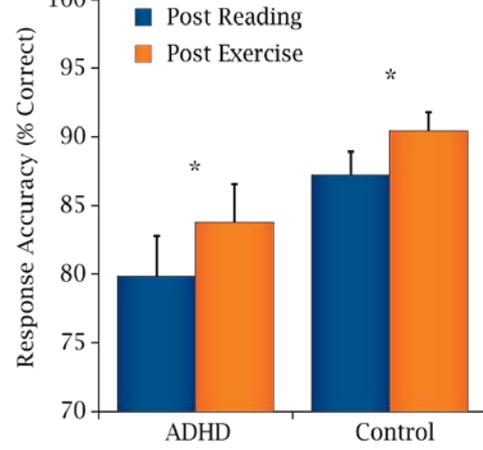
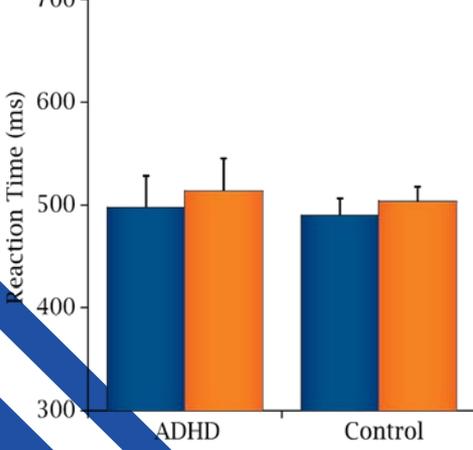
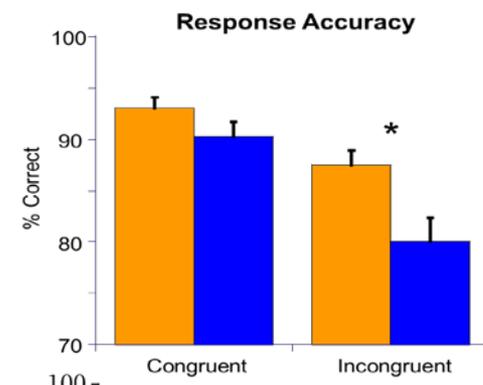
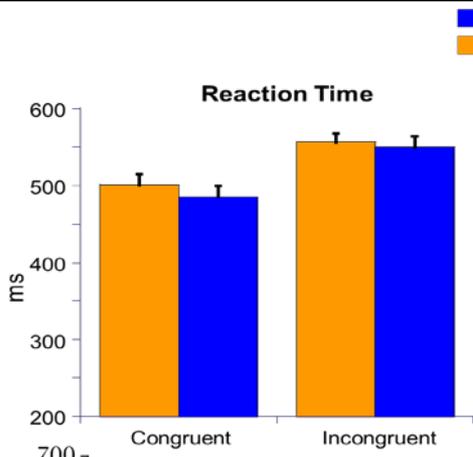


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Acute Exercise and Cognition



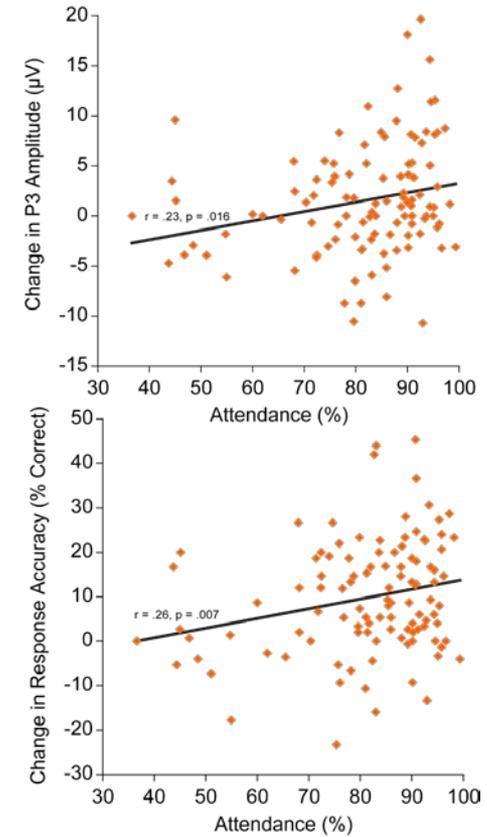
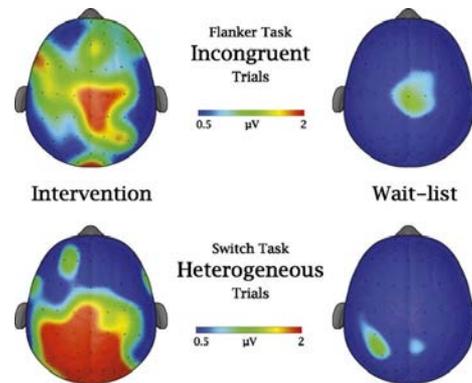
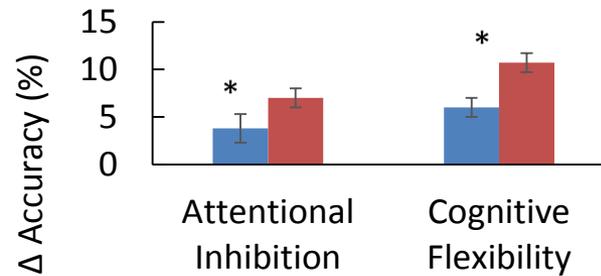
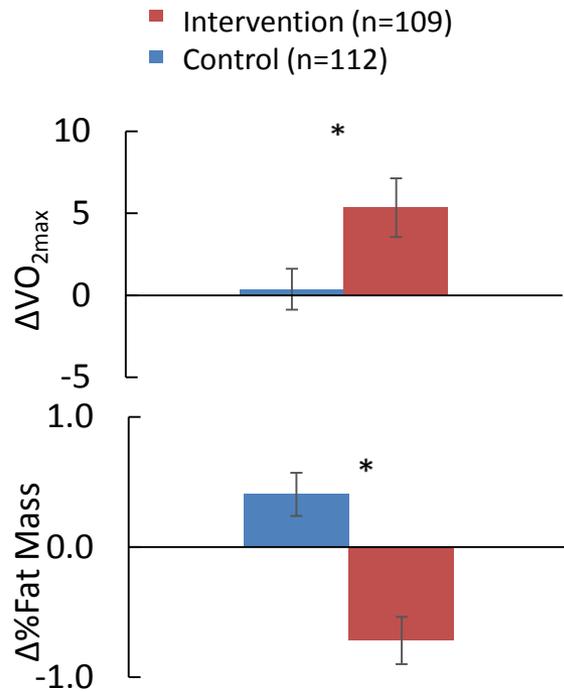
Hillman et al. (2009). *Neuroscience*, 159, 1044-1054.
 Pontifex et al. (2013). *J. Pediatrics*, 162, 543-551.

FITKids

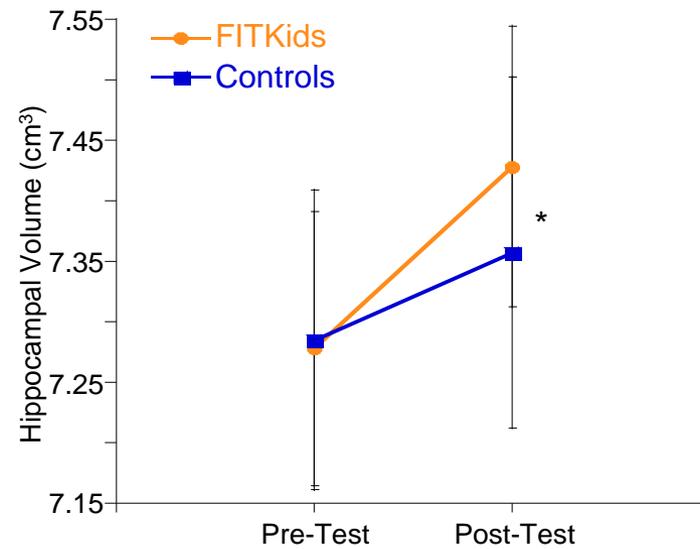
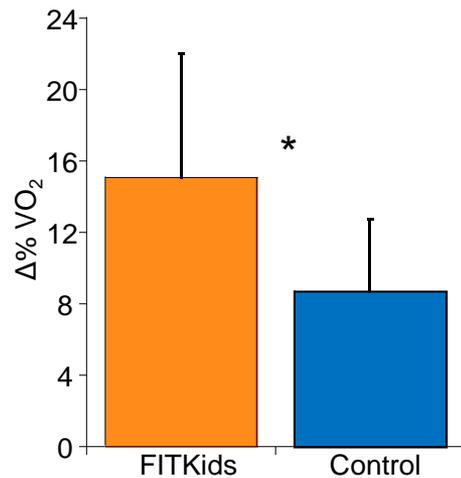
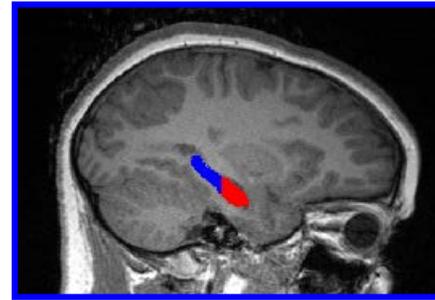
- Aim: increase cardiorespiratory fitness using physical activity
- Afterschool PA program
- 2 hr/day, 5 days/week, 9 months
- Based on CATCH curriculum



FITKids: Improvements in Cognitive Control



FITKids: Increases in Hippocampal Volume





Physical Activity & Fitness



Cognitive Function



Nutrition



Obesity & Adiposity



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OBESITY

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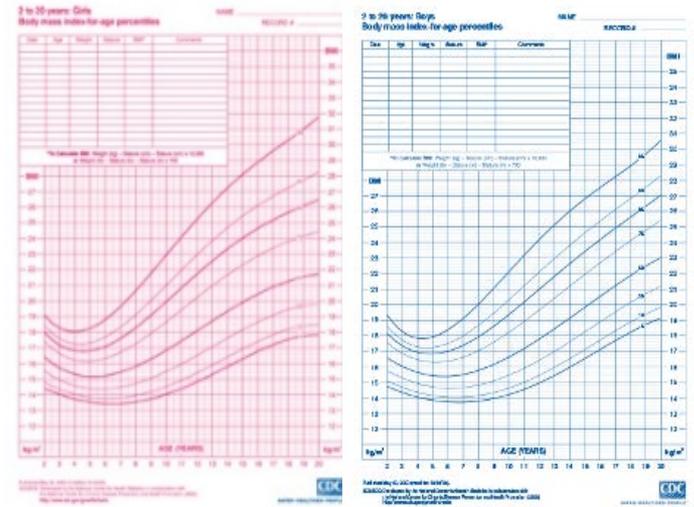
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Childhood Obesity

- Definition
- Measurement
- Cause



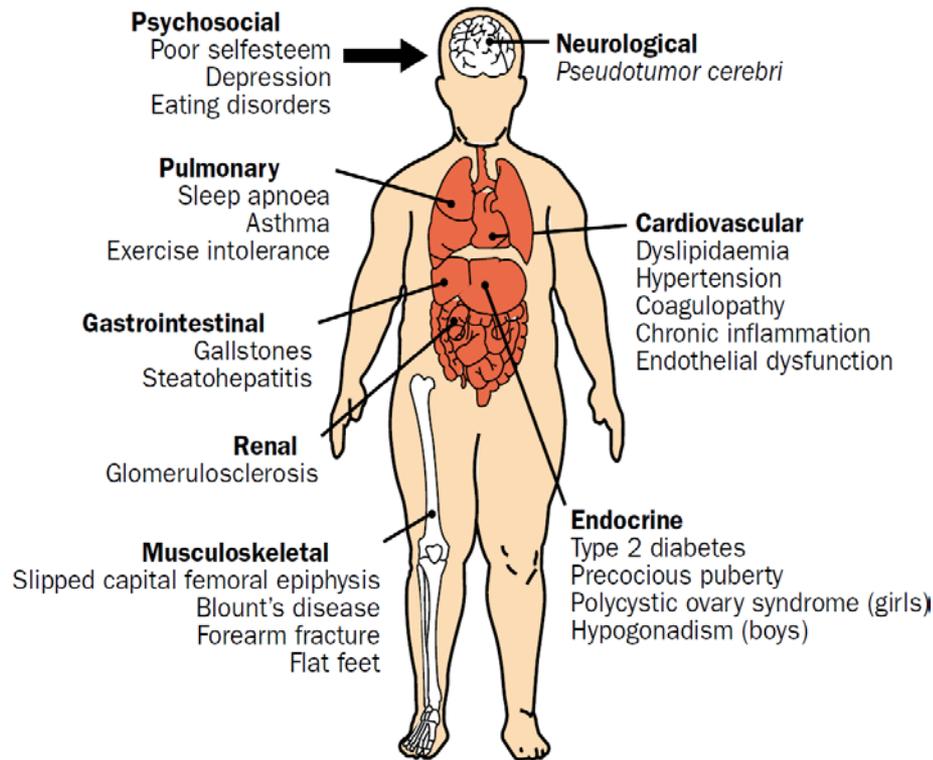
Ebbeling et al., 2002; Strum et al., 2002

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Childhood Obesity Consequences



RISK FACTORS

- Children in their early teens who are obese and who have high triglyceride levels have arteries similar to those of 45-year-olds.
- Obese children as young as age 3 show indicators for developing heart disease later in life.
- Children who are overweight from the ages of 7 to 13 may develop heart disease as early as age 25.
- Obese children are twice as likely to die before age 55 than their slimmer peers.

Ebbeling et al., 2002; Strum et al., 2002, heart.org/healthierkids

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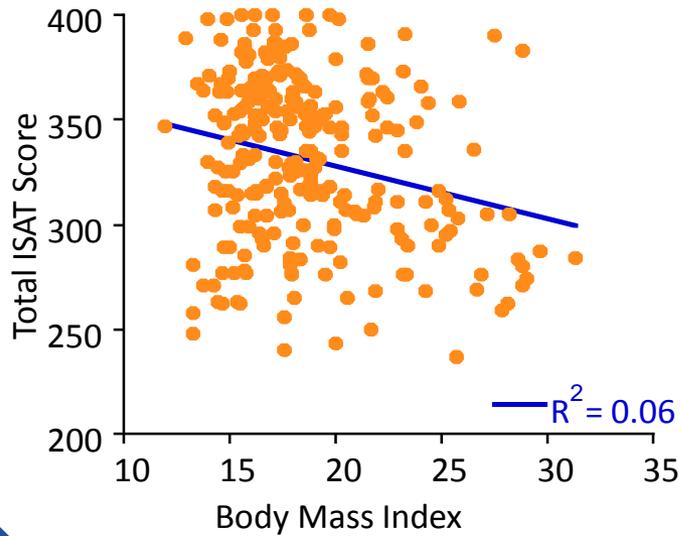
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BMI and Academic Achievement

Cross Sectional



Longitudinal

Kindergarten Entry
Not Overweight



End of 3rd Grade
Overweight



Adverse School Outcomes:

Academic Outcomes

Behavioral Outcomes

Castelli et al., 2007; Datar & Strum, 2006

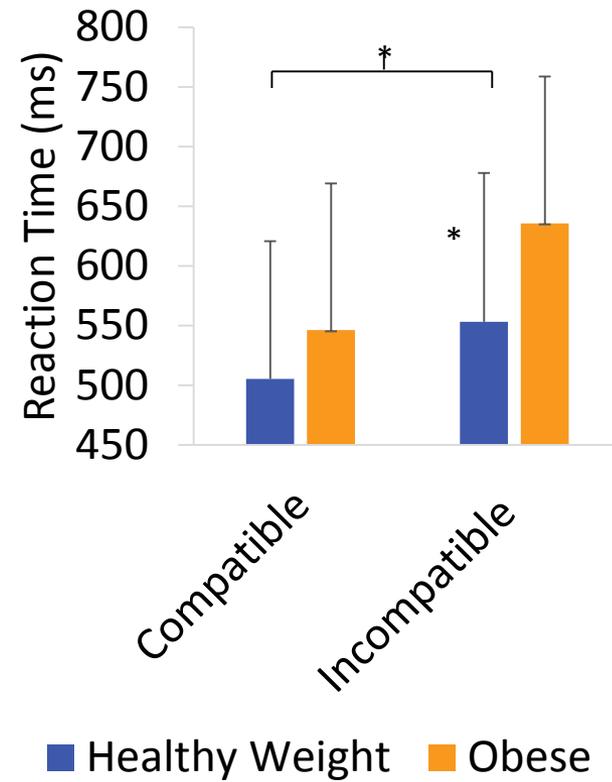
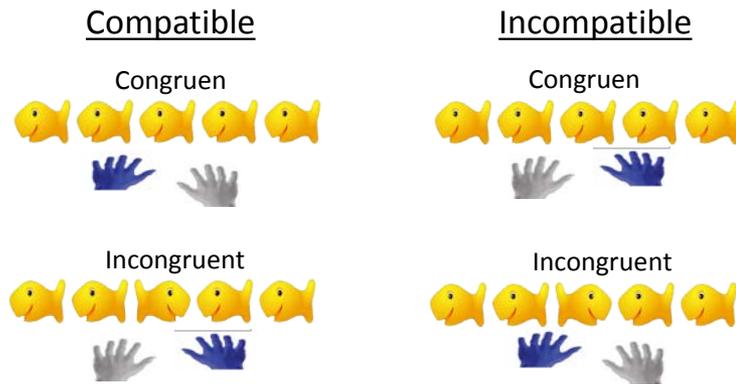
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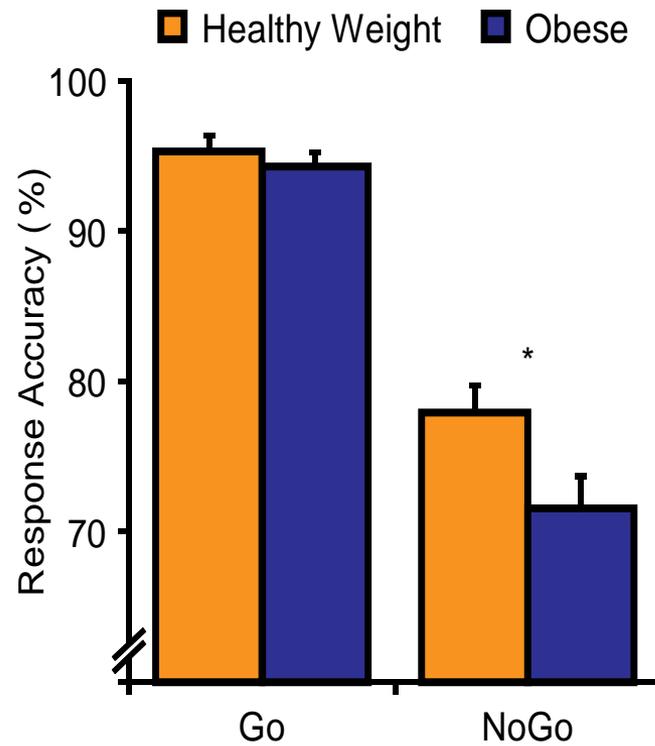
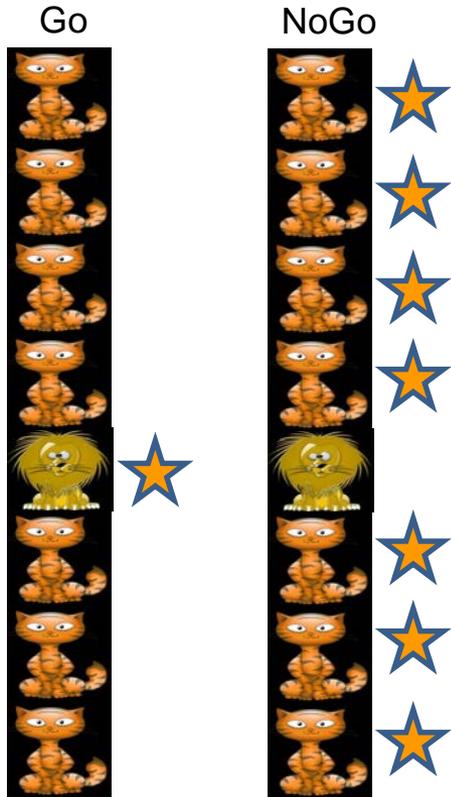
Obesity and Inhibition

Measure	Healthy weight	Obese
	≥5th to <85th BMI percentile	≥95th BMI percentile
No. of participants	37 (20 girls)	37 (20 girls)
Mean age (years)	8.8 (0.6)	8.9 (0.6)
Age range (years)	7.9–9.9	8.0–9.9
K-BIT composite score (IQ)	112.5 (13.2)	110.4 (10.9)
SES	1.9 (0.9)	1.8 (0.9)
VO _{2max} (mL/kg FFM/min)	50.9 (5.7)	49.5 (7.3)
BMI (kg/m ²)*	16.7 (1.4)	25.2 (2.9)
BMI percentile*	56.8 (19.9)	98.0 (1.4)
Whole-body percent fat (%)*	24.7 (6.6)	36.7 (6.1)





Obesity and Inhibition



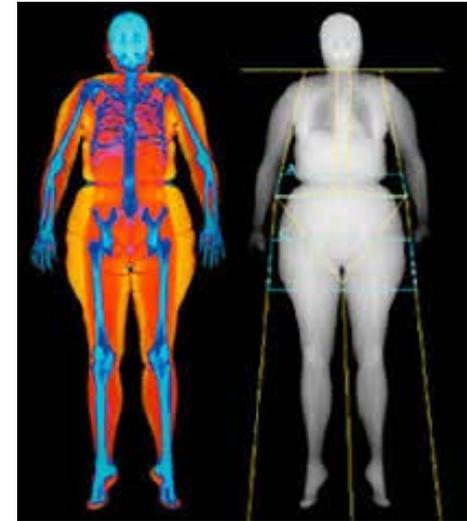
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Moving Beyond BMI



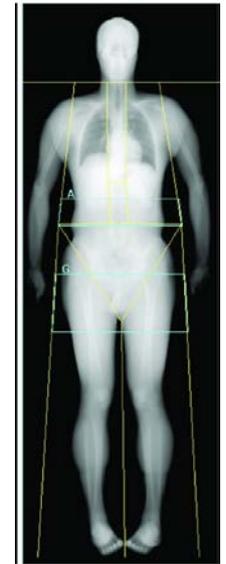
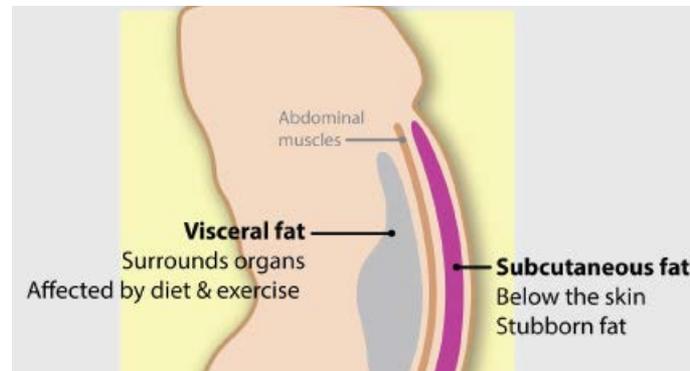
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Types of Adipose Tissue

- Subcutaneous Abdominal Adipose Tissues (SAAT): adipose tissue present directly underneath the skin
- Visceral Adipose Tissue (VAT): adipose tissue distributed within body cavities



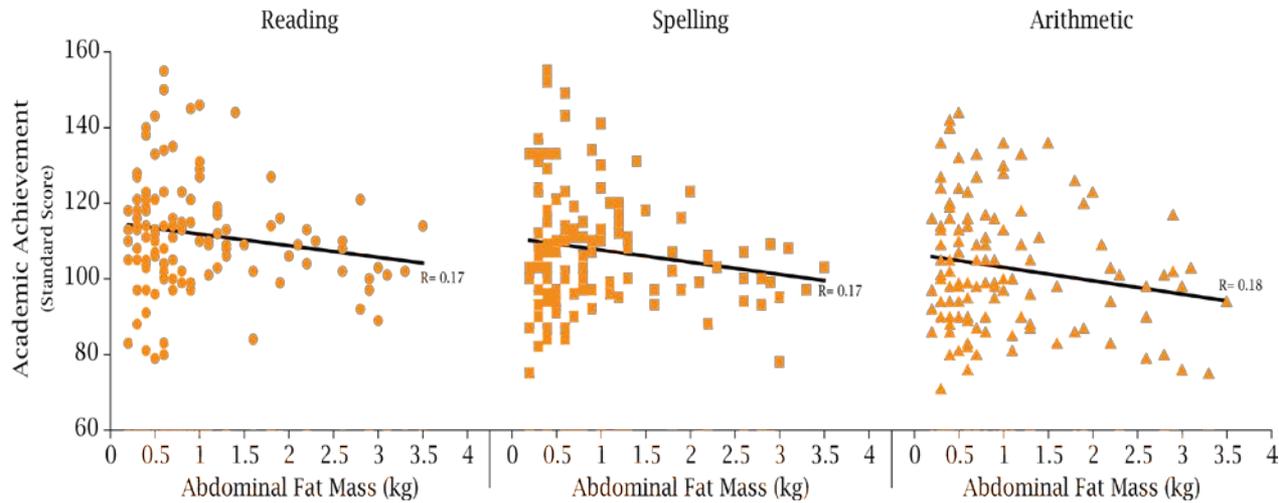
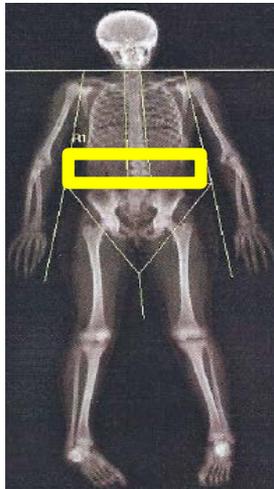
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Adiposity and Academic Achievement



Kamijo et al., 2012

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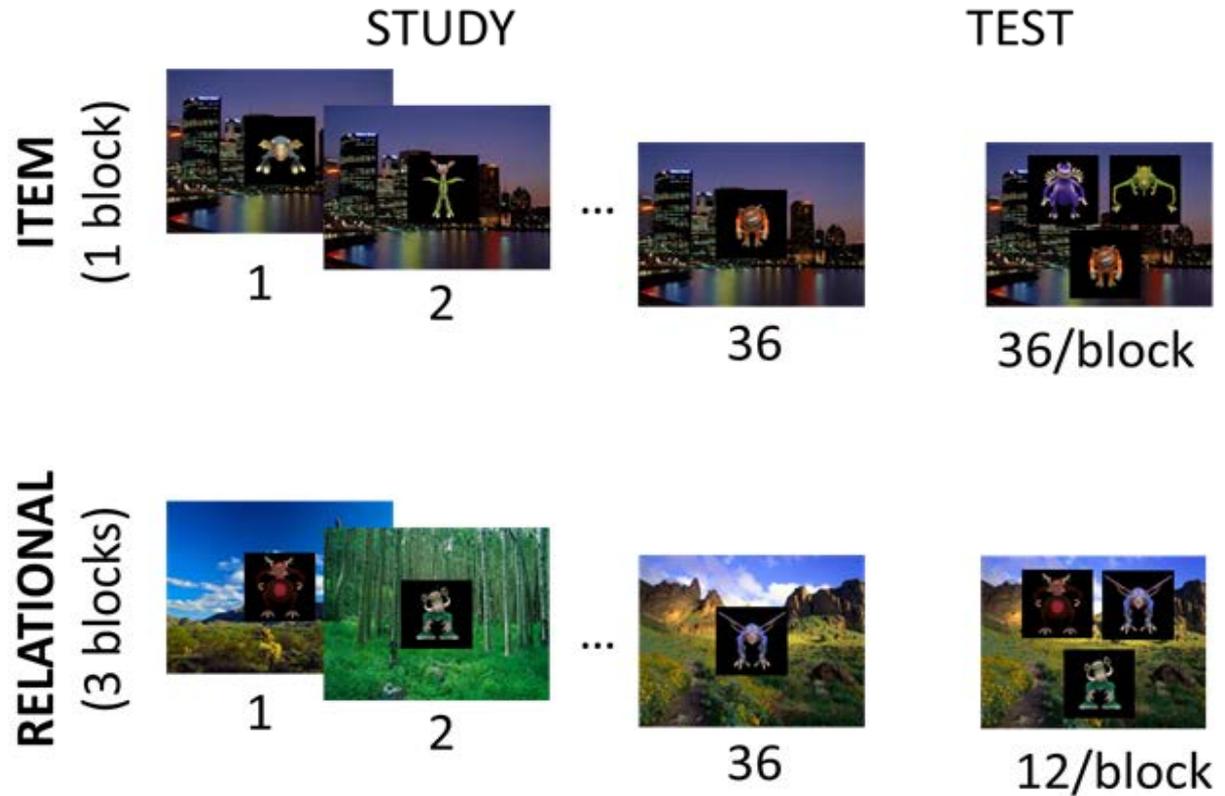
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Adiposity and Relational Memory

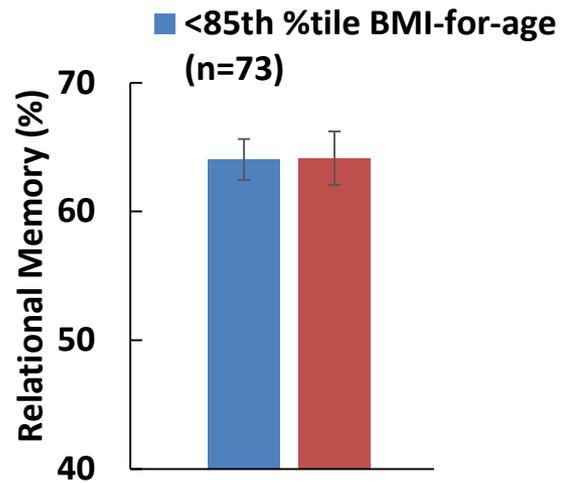
Table I. Body composition and memory performance of participants by weight status

Variables	Non-overweight (n = 73)	Overweight/obese (n = 53)
IQ	111.1 ± 14.1	108.7 ± 11.8
BMI z-score*	-0.07 ± 0.81	1.82 ± 0.54
VO _{2max} , kg/mL/min*	44.0 ± 6.1	36.7 ± 5.8
Fat-free VO _{2max} , kg/mL/min	60.7 ± 7.4	59.6 ± 7.3
WBFM, %*	28.5 ± 4.7	39.4 ± 5.1
TAAT, cm ² *	135.4 ± 45.3	325.7 ± 128.5
SAAT, cm ² *	109.4 ± 47.2	266.2 ± 113.8
VAT, cm ² *	26.0 ± 11.2	59.5 ± 20.6
Relational memory accuracy, %	64.1 ± 13.6	64.1 ± 15.1
Item memory accuracy, %	86.6 ± 9.5	85.5 ± 8.9
Relational memory PDV, %	8.4 ± 8.9	8.4 ± 9.9
Item memory PDV, % [†]	9.6 ± 13.9	11.2 ± 12.3



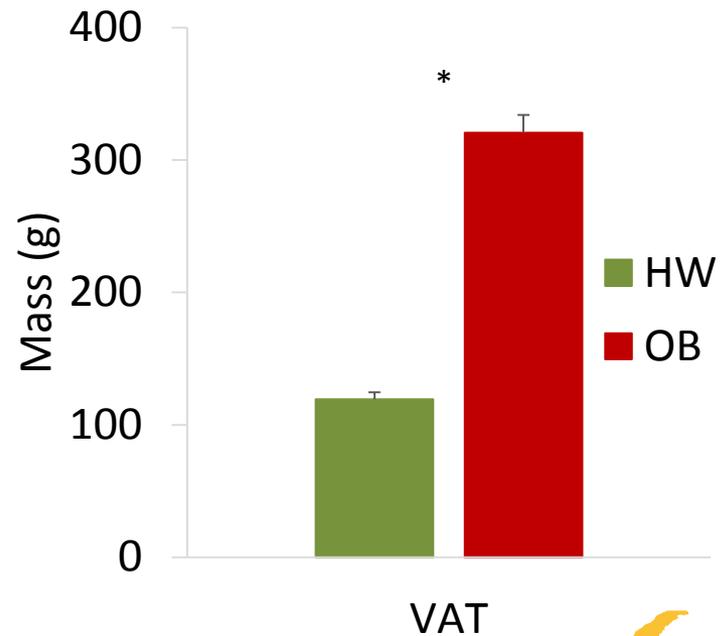


Relational Memory by Weight Status



FITKids: Physical Activity, Obesity, and Inhibition

	Healthy Weight	Obese
n	77 (49 females)	77 (49 females)
Age (years)	8.88 ± 0.08	8.81 ± 0.06
IQ	105.81 ± 1.51	108.14 ± 1.38
SES	1.68 ± 0.08	1.73 ± 0.09
VO ₂ (ml/ kg lean/ min)	56.63 ± 0.81	54.35 ± 0.86
VAT* (g)	119.40 ± 5.22	320.67 ± 13.45
SAAT* (g)	536.65 ± 30.62	1509.29 ± 57.19
Whole Body %Fat*	27.51 ± 0.54	40.78 ± 0.54



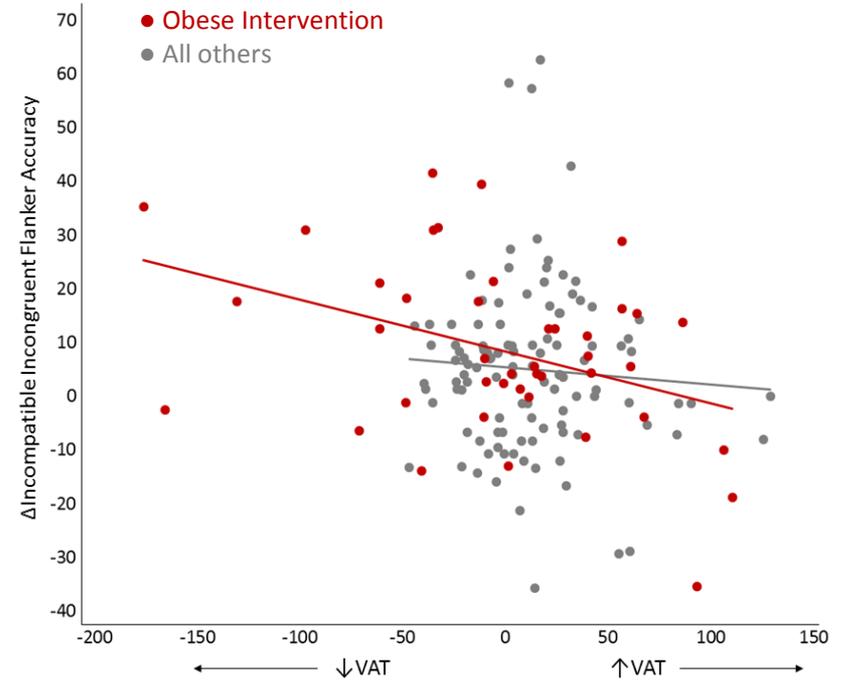
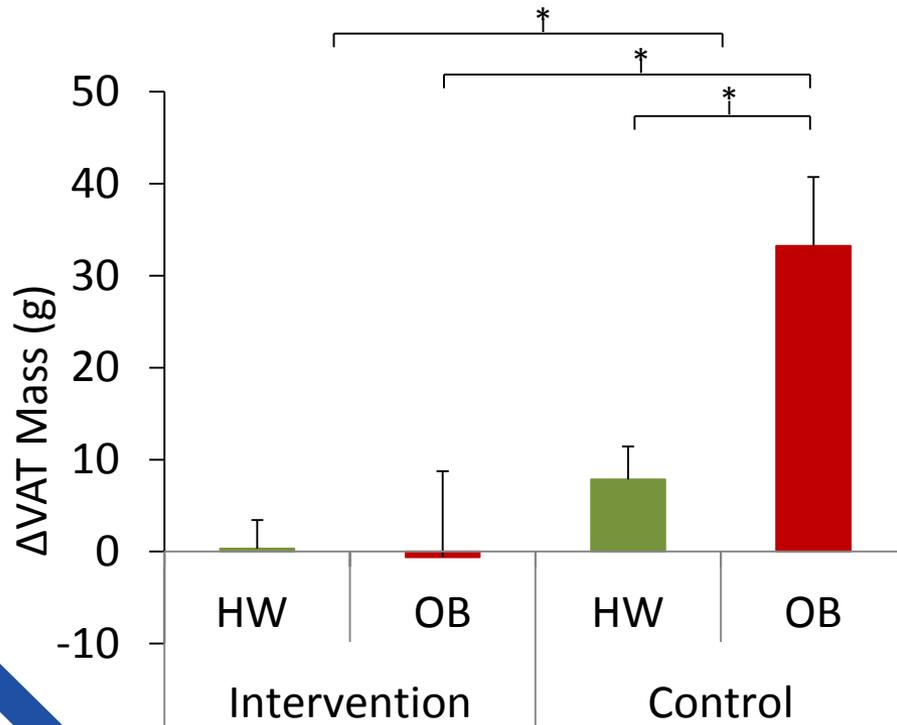
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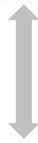


FITKids: Physical Activity, Obesity, and Inhibition





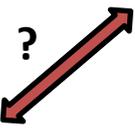
Physical Activity & Fitness



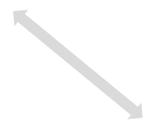
Cognitive Function



Nutrition



Obesity & Adiposity

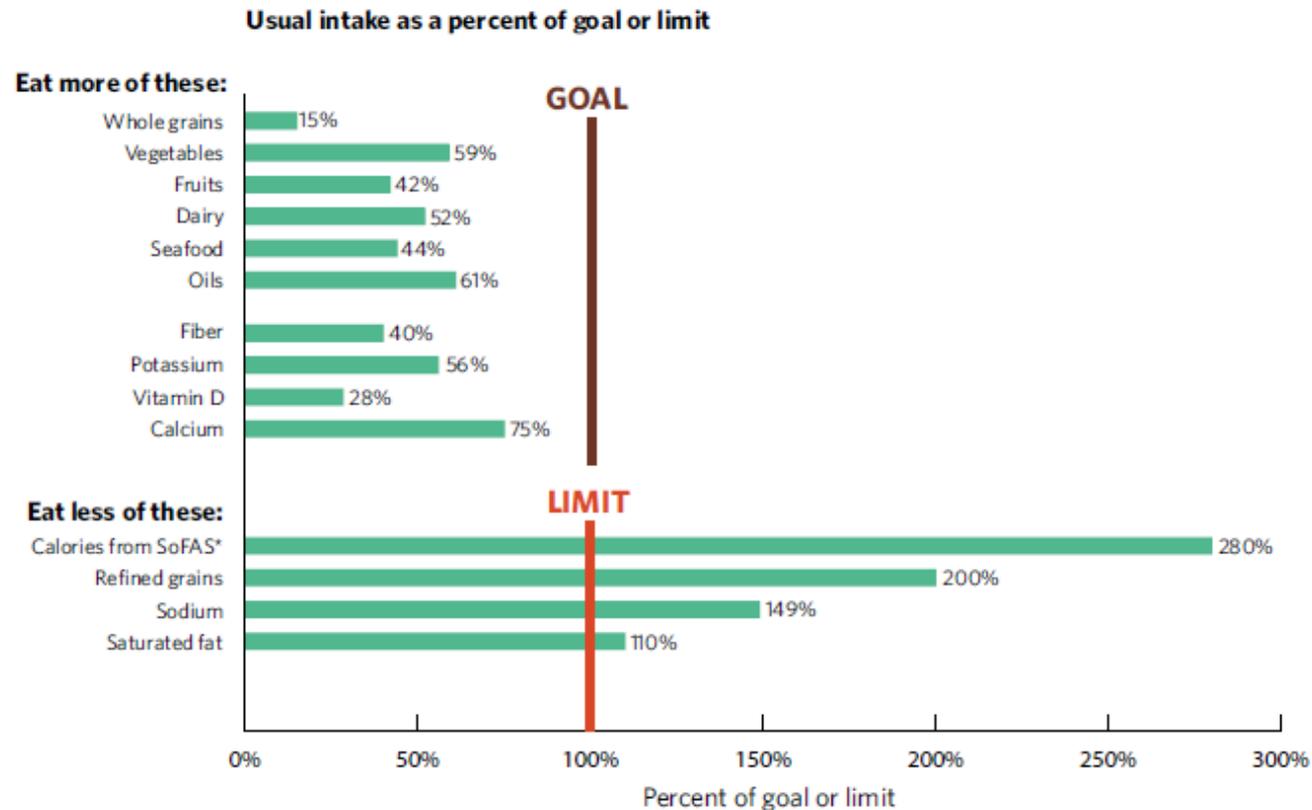


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Typical Diet vs. Recommended



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Dietary Lipids/ Fats and Memory

2012 Youth Adolescent Food Frequency Questionnaire

MARKING INSTRUCTIONS

The RIGHT way ● The WRONG way ✓ X

- Use a **NO. 2 PENCIL** only.
- Do not use ink or ballpoint pen.
- Darken in the circle completely.
- Erase clearly any marks you wish to change.
- Do not make any stray marks on this form.

USE NO. 2 PENCIL ONLY

1. What is your AGE? 2. Are you: 3. Your Height 4. Your Weight

5. Do you now take vitamins (like Flintstones, Centrum, Centrum Kids)?

6. Do you take any other separate vitamin or mineral pills? (NOT the multivitamin pill listed in question 5)

7. How often do you eat food that is fried at home like french fries, chicken nuggets?

8. How often do you eat fried food every from home like french fries, chicken nuggets?

DRINKS

1. Diet sodas (pop) (1 can or individual bottle)

2. Sodas (pop—not diet) (1 can or individual bottle)

3. What is the **smallest serving size** of the soda/pop you drink (any type)?

4. Sugared **land** tea, fruit drinks, punch, lemonade, Sunny D, Kool-Aid or other non-martianized fruit drink—**NOT JUICE** (1 glass, can or individual bottle)

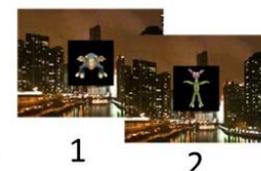
page ONE SERIAL #

RELATIONAL (6 blocks)

ITEM (2 blocks)

STUDY

TEST

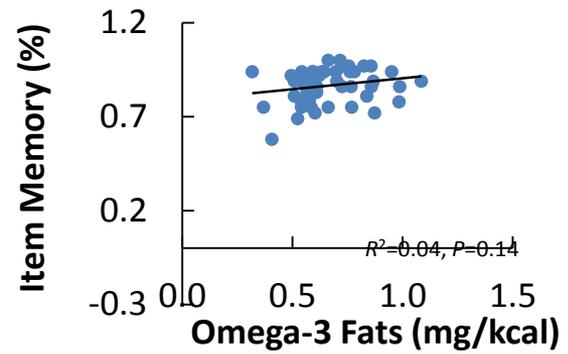
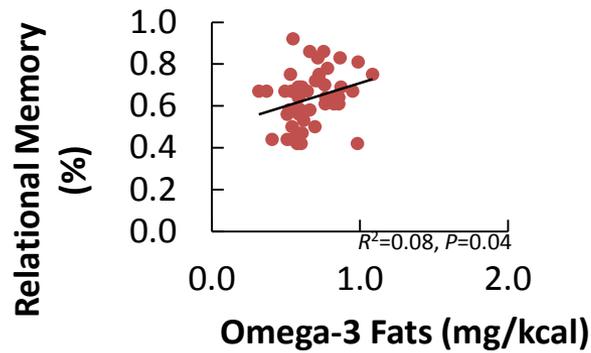


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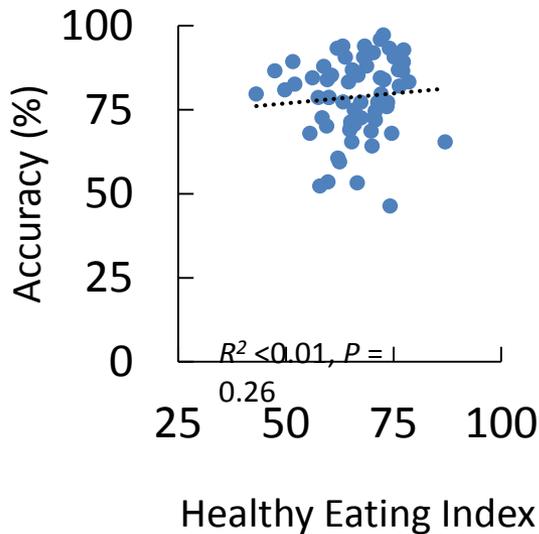


Dietary Lipids/ Fats and Memory

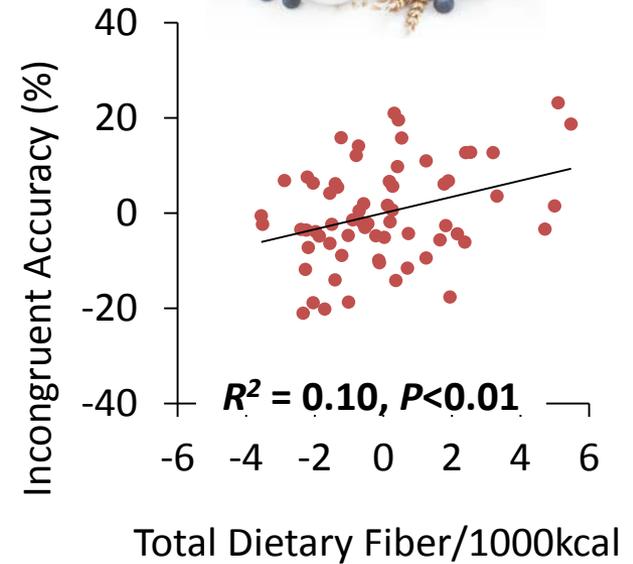
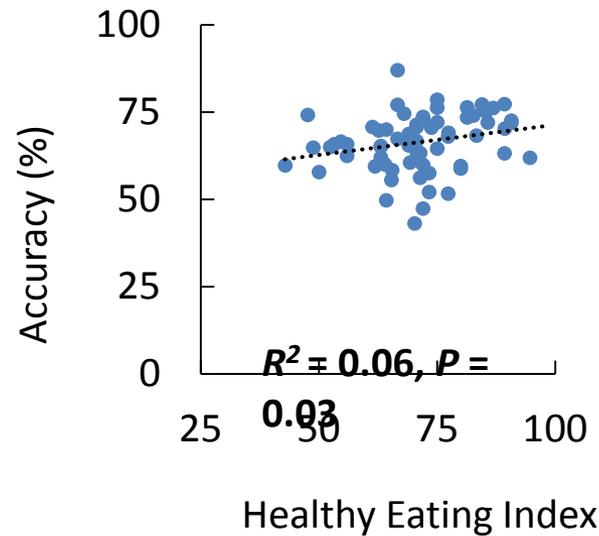


Diet Quality and Inhibition

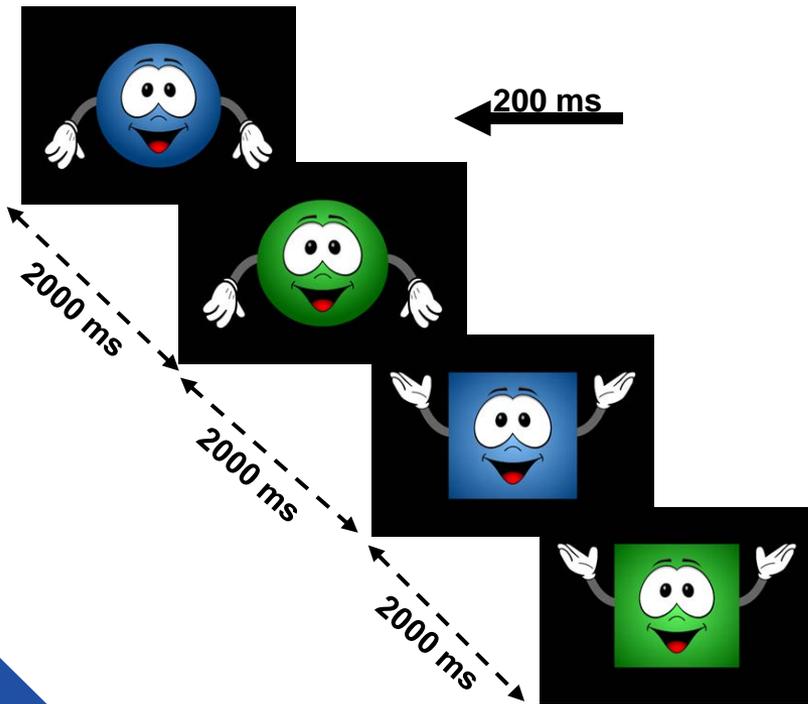
Congruent



Incongruent



Saturated Fats, Cholesterol, and Cognitive Flexibility



- Total fats, saturated fats, and cholesterol: related to greater local switch cost, reflecting less effective cognitive control processes
- Saturated fats: related to increased reaction time and global switch cost for reaction time, reflecting less efficiency of maintaining multiple task sets in working memory
- Cholesterol intake: related to increased local switch costs reflecting less effectiveness of cognitive control processes

Macular Pigment Optical Density and Academics



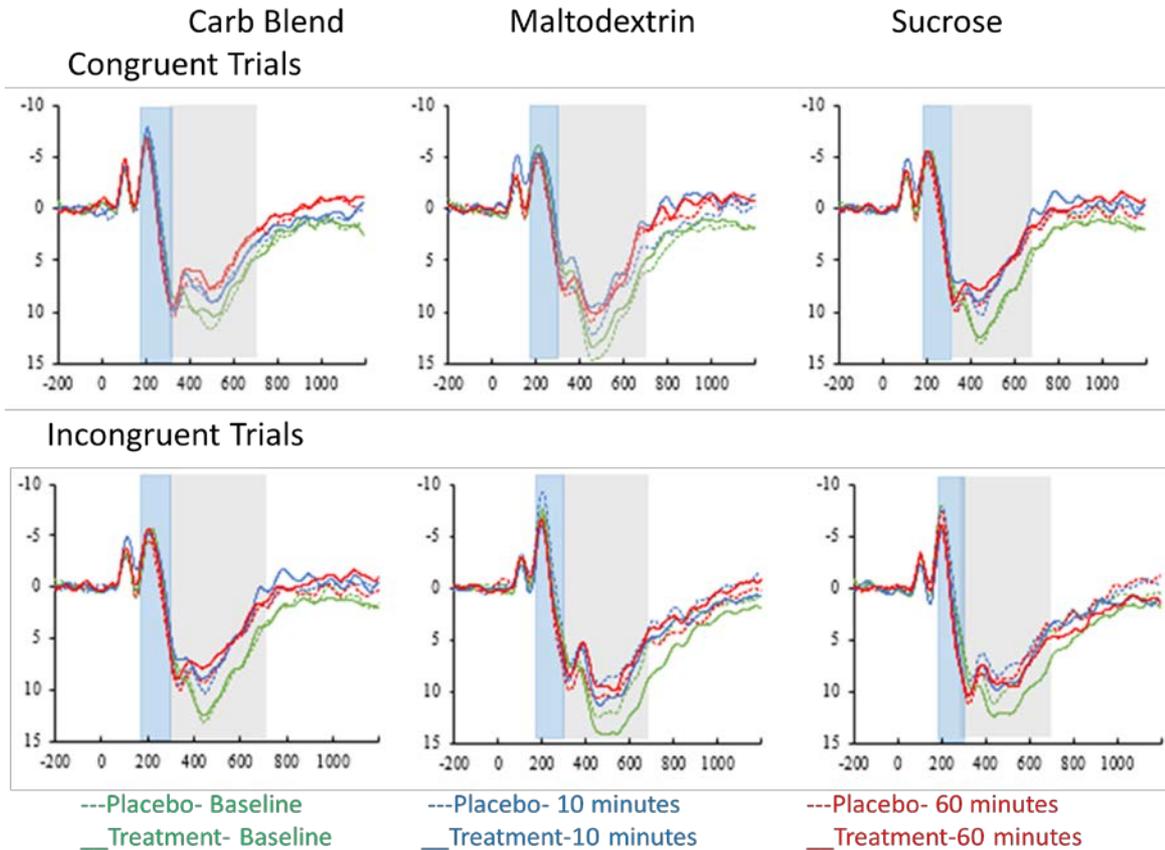
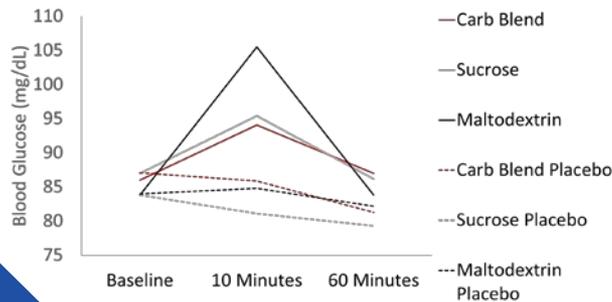
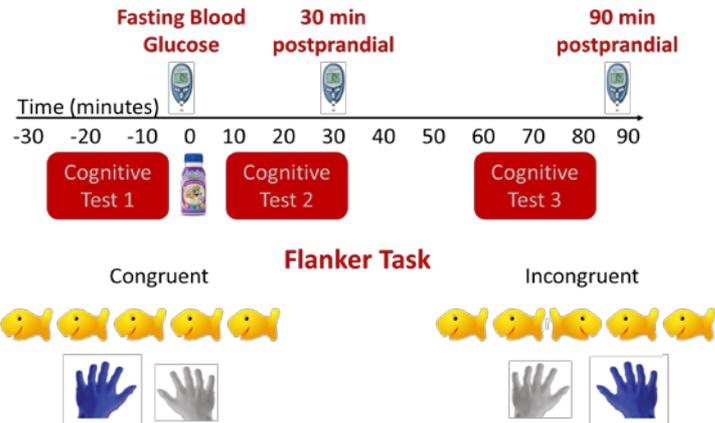
Table 3 Summary of regression analyses predicting academic achievement composite standard scores^a

Step and variable	Achievement		Reading		Math		Written language		Reading fluency	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Step 1		0.43*		0.40*		0.32*		0.23*		0.29*
Sex	-0.04		-0.02		0.00		-0.12		-0.01	
IQ	0.60*		0.57*		0.47*		0.47*		0.52*	
Whole body % fat	-0.02		0.04		-0.04		-0.04		0.10	
Fat free mass VO ₂	0.22		0.29*		0.24		-0.04		0.22	
Step 2				0.04						0.02
MPOD	0.32*	0.10*	0.20		0.27*	0.07*	0.40*	0.15*	0.16	

^a $P < 0.05$. IQ, Intelligence quotient. $n = 56$.



Effects of Carbohydrates on Inhibitory Control





Conclusions

- Fitness and physical activity may benefit academic performance and brain health.
- Single bouts of aerobic exercise benefit basic and applied aspects of cognitive performance.
- Fitness has been linked to changes in cognition that are disproportionately larger for tasks requiring cognitive control.
- Collectively, these data suggest that time spent engaged in physically active does not detract from academic performance.
- Obesity may have a detrimental relationship with brain structure and function
- Habitual intake of omega-3 fatty acids and dietary fiber appear to be positively related to children's cognitive function
 - Negative relationship with saturated fats
 - Overall diet quality matters!
- Early intervention is crucial toward lifespan health and effective function of brain and cognition.



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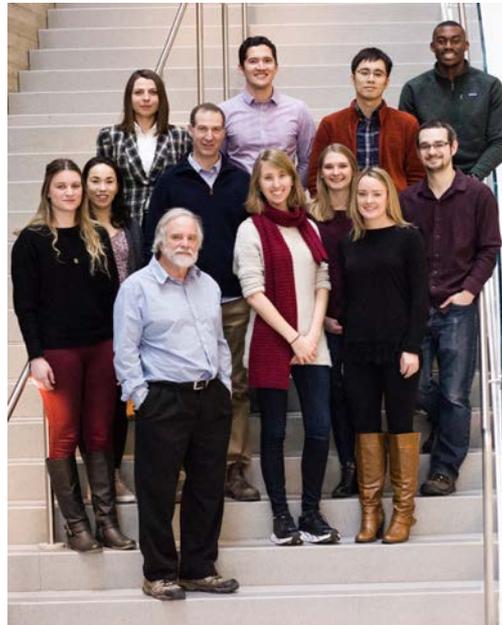
Acknowledgements

Advisor

Dr. Charles Hillman

Collaborators

- Carol Baym
- Laura Chaddock
- Neal Cohen
- Eric Drollette
- Kirk Erickson
- Keita Kamijo
- Alvin Kao
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- Art Kramer
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- Mark Scudder



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Danone Research

Illinois Transdisciplinary Obesity Prevention
Program National Institute for Agriculture

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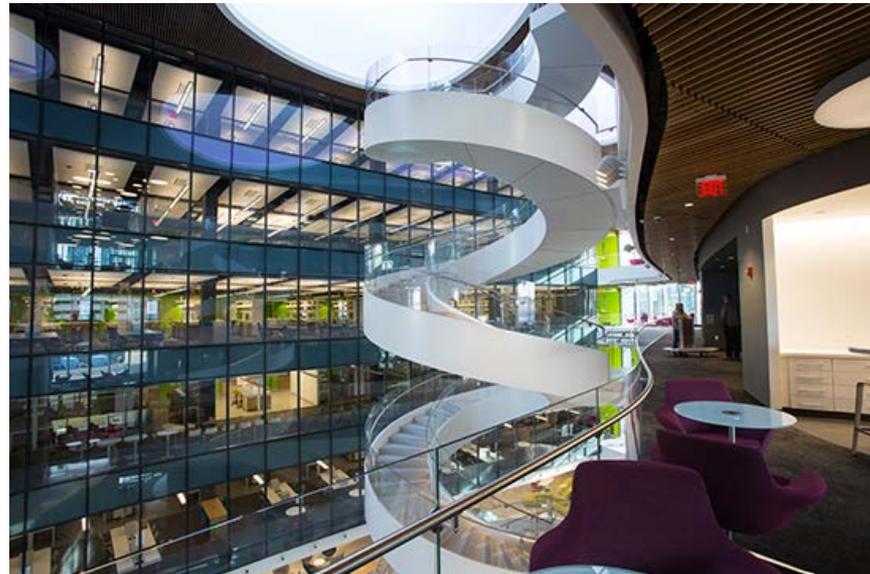
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Thank You!

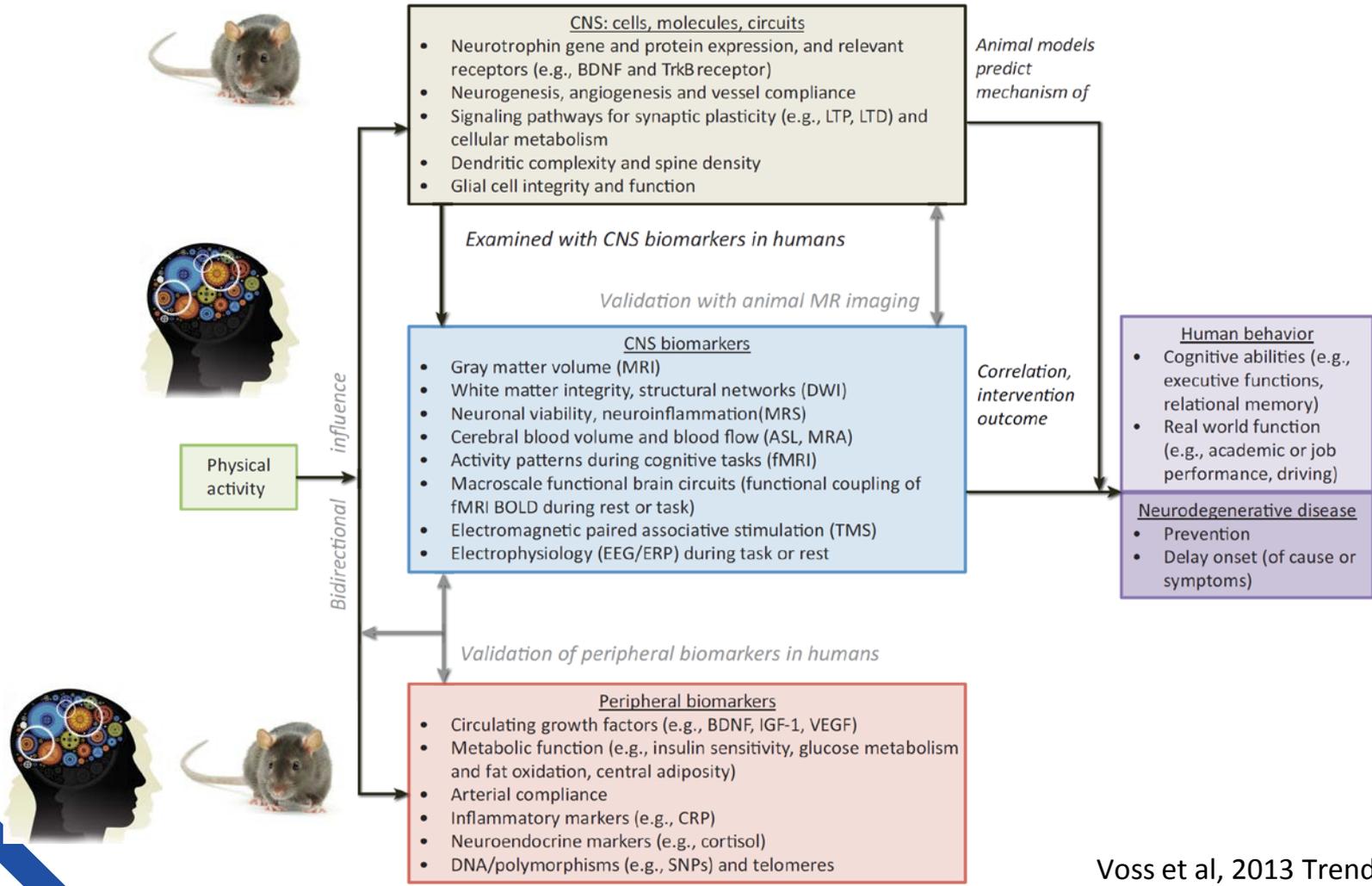
Questions?



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The 12 HEI-2010 Components

ADEQUACY

- 1.** Total Fruit (all forms of fruit, including fruit juice)
- 2.** Whole Fruit (all forms except fruit juice)
- 3.** Total Vegetables
- 4.** Greens and Beans (dark green vegetables and any beans and peas [i.e., legumes] that are not already counted as protein foods)
- 5.** Whole Grains
- 6.** Dairy (fat-free portion of all milk products; includes fluid milk, yogurt, cheese, and fortified soy beverages)
- 7.** Total Protein Foods (lean portion of meat and poultry; eggs; beans and peas)

- 8.** Seafood and Plant Proteins (fish, shellfish, nuts, seeds, soy foods other than soy beverages, and beans and peas included in Total Protein Foods)
- 9.** Fatty Acids (ratio of polyunsaturated and monounsaturated fatty acids to saturated fatty acids)

MODERATION

- 10.** Refined Grains
- 11.** Sodium
- 12.** Empty calories (calories from solid fats, including the fat from animal foods in the Dairy and Total Protein Food components; added sugars; alcohol consumed beyond moderate amounts)



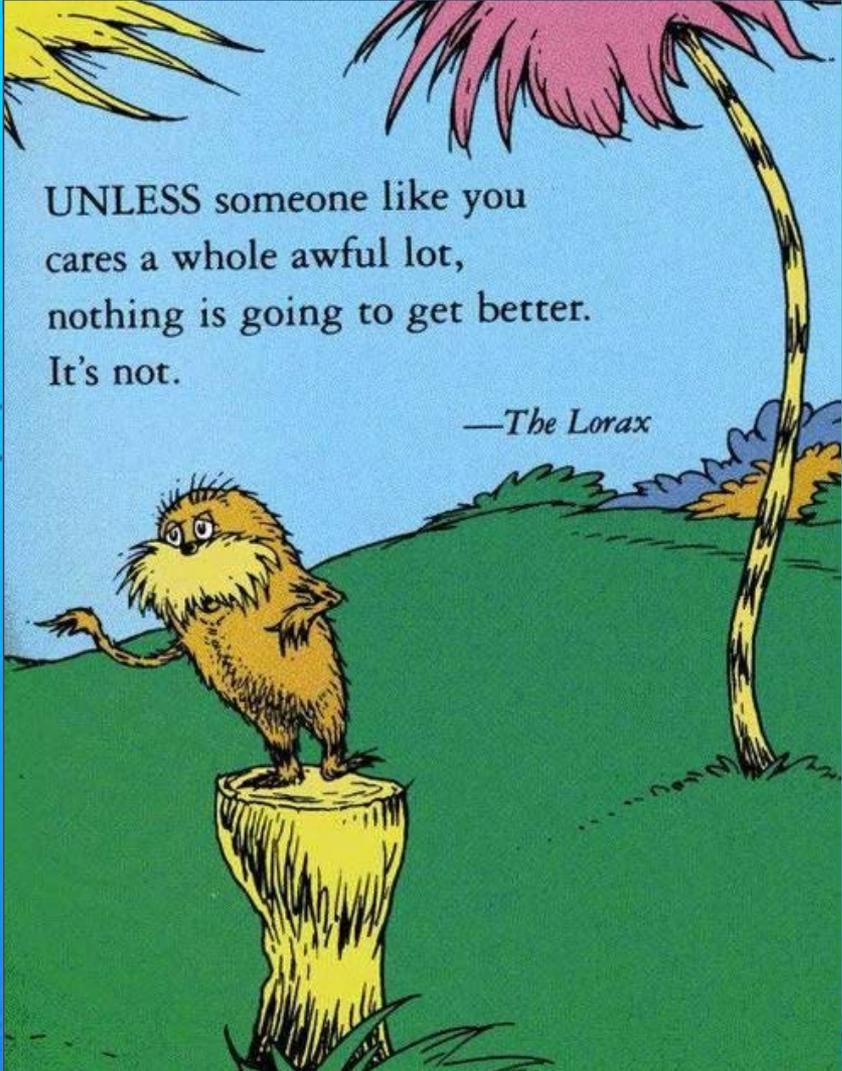
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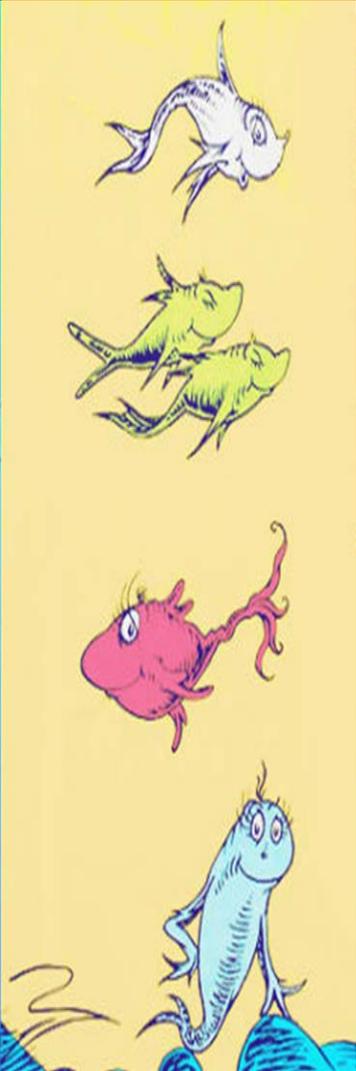
Healthy Body, Healthy Mind: Exploring the Relationship Between Nutrition, Physical Activity and Cognition

Elizabeth Zmuda D.O., FAAP, FACOP



UNLESS someone like you
cares a whole awful lot,
nothing is going to get better.
It's not.

—*The Lorax*



There's much more at stake than just obesity

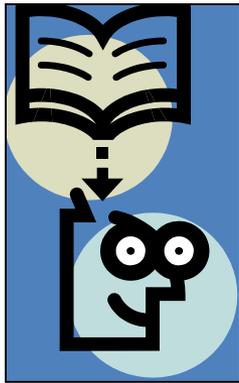




Epigenetics

Physiology of Stress

Neuroscience



**The Science of
Early Brain and
Child Development**

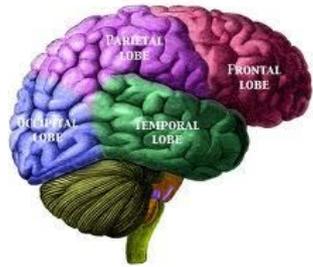


★ Education

Health

Economics

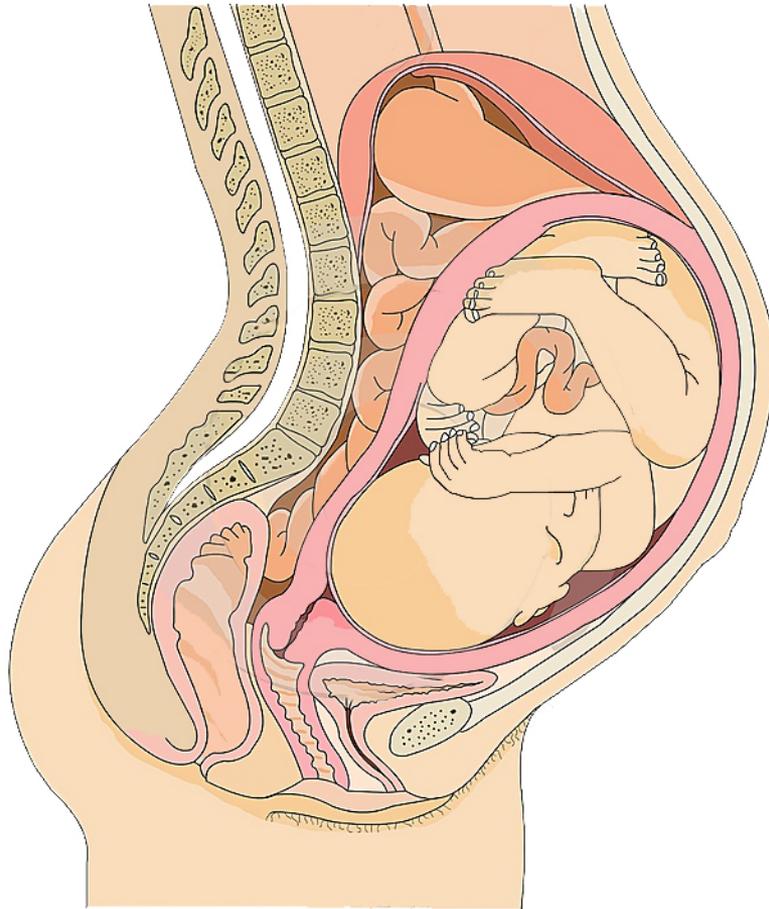
New Science – Many Implications



Brain Structure Changes With Experiences, Especially in The Developing Brain



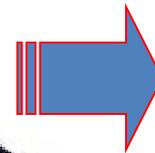
Parenthood begins at Conception



- Energy or protein
- Micronutrients
- Placental failure
- Blood flow
- Medications
- Physical/ Mental Stress
- Smoking, alcohol
- Toxins
- Oxygen
- Blood sugar
- Weight gain

Fetal Experiences “Program” Future Disease

- Growth
- Obesity
- Hypertension
- Abnormal Lipids
- Cardiovascular Disease
- Diabetes
- Metabolic Syndrome
- Behavioral Health

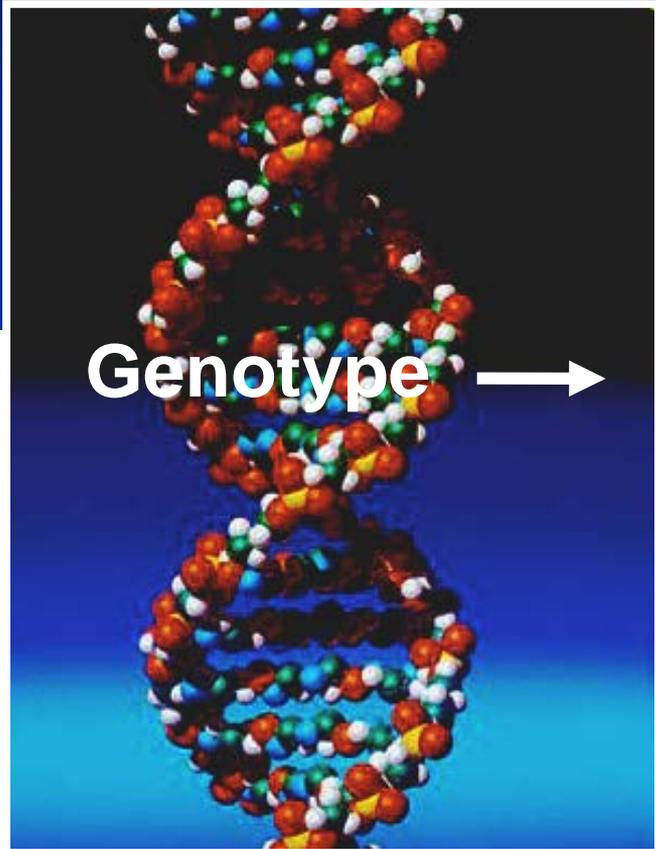


P Gluckman, NEJM 2009

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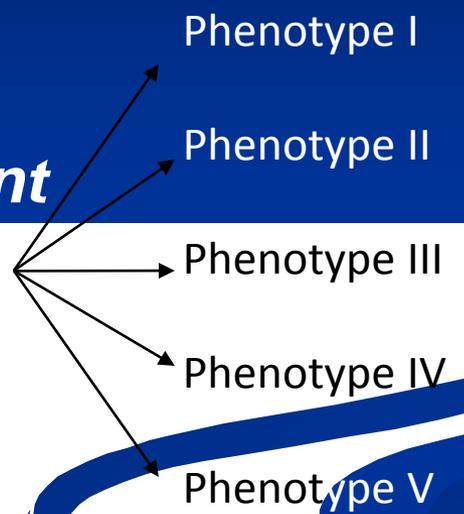
Genotype



Environment

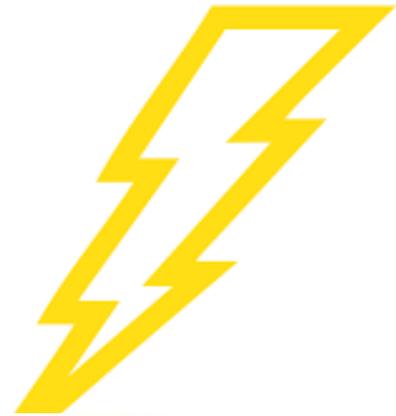


In Utero



What if genes were modified by experiences?

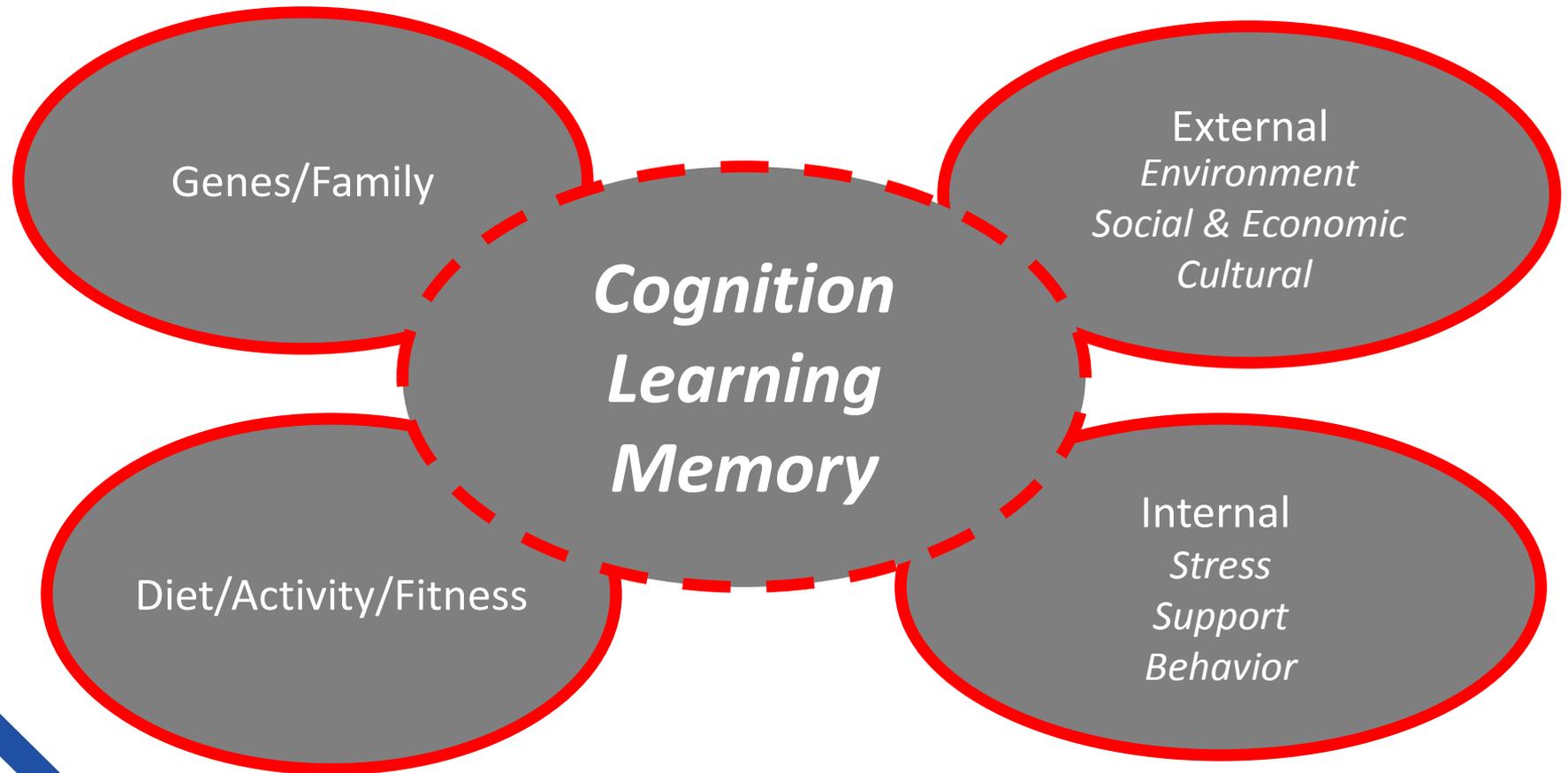
Epigenetics



Nature

doi:10.1038/nature.2013.14272

Brain Development



We Can Do Something

Brain Structure (and Function)



- The Brake – PFC (with some hippocampal help)

Frontal lobes:

Abstract thought, reasoning, judgment, planning, impulse and affect regulation, consequences

Temporal lobe (outside):

Processing sound and language

Limbic System (inside):

Emotions and impulsivity

**+ The Gas Pedal +
Amygdala**

Parietal Lobe:

Integration of sensory data and movement

Occipital Lobe:

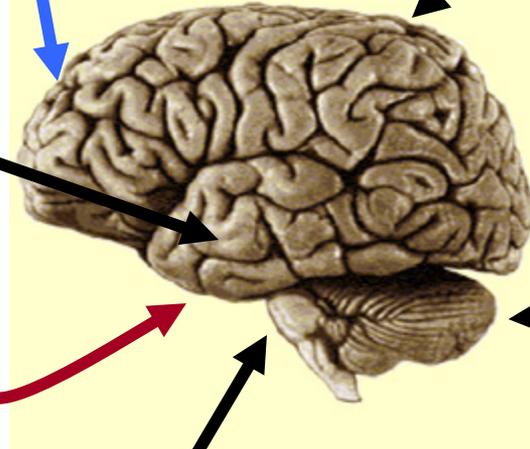
Visual processing

Cerebellum:

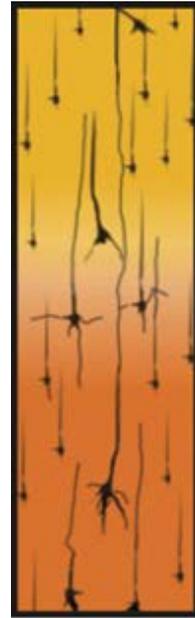
Smooth movements
Coordination

Brain Stem & Cranial Nerves:

Vital functions
Swallowing



It's all about connections



Newborn



1 Month



9 Months



2 Years



Adult

- The brain doubles in size in just one year
- By year 3 it is almost adult-size
- ***Stimulation*** strengthens connections
- Unstimulated, those connections *disappear*

Early Intervention & Adult Health

The Carolina Abecedarian Study

1972-77: 111 Impoverished Children Randomized

57 Children

Preschool 0-5 years

8 hrs/ day

2 meals, 1 snack

Supervised play

Cognitive & Social stimulation:

- Language
- Emotional regulation
- Cognitive skills



54 Children

Controls

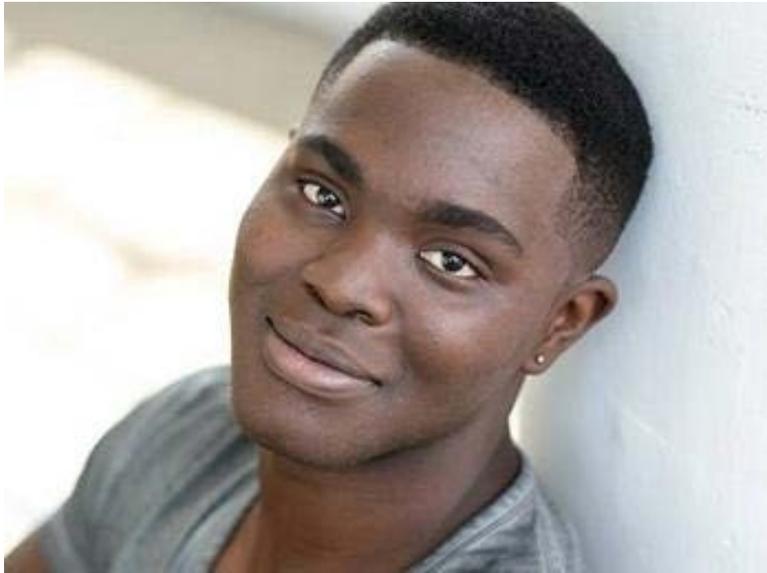
No intervention

- Survey: children, parents, teachers
- Demographics
- Health evaluation
- Lab tests
- Personality & Behavior
- Cognition & Achievement

Follow-up years:

12, 15, 21, 30 and mid-30s

At Age 21



- Better School Performance
- More years of education
- Delayed parenthood
- Less drug use
- Less Depression

At Age 30



- More likely to have a bachelor's degree
- More likely to have a job
- Delayed parenthood

Early BMI rise predicted obesity
at age 30 years

Almost *no treated child* was above the 85th
percentile BMI in first 2 years

Significantly lower BMI at age 8 years



Early Childhood/ Adult Health

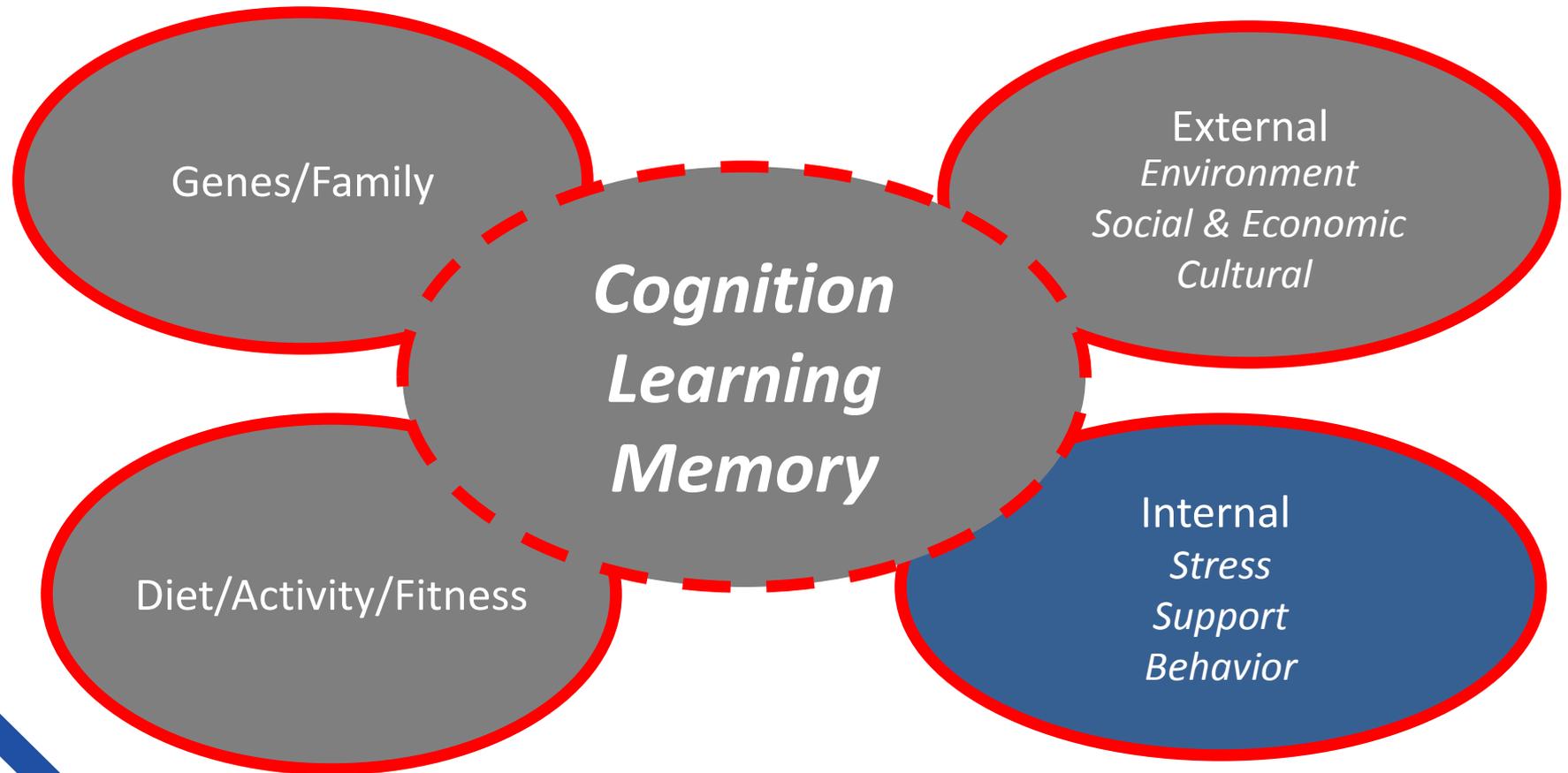
Physical Health at 40

- BP Lower
 - Systolic: 17.5 mm Hg
 - Diastolic: 13.5 mm Hg
- Lipids
 - HDL: 11 mg/dL higher
 - Abn Lipids: 31% less (males)
- Obesity
 - Lower abd and severe obesity
- Metabolic syndrome
 - Controls $\frac{1}{4}$; Treated none
- Cardiovascular risk score
 - 2 fold lower

Males > Females

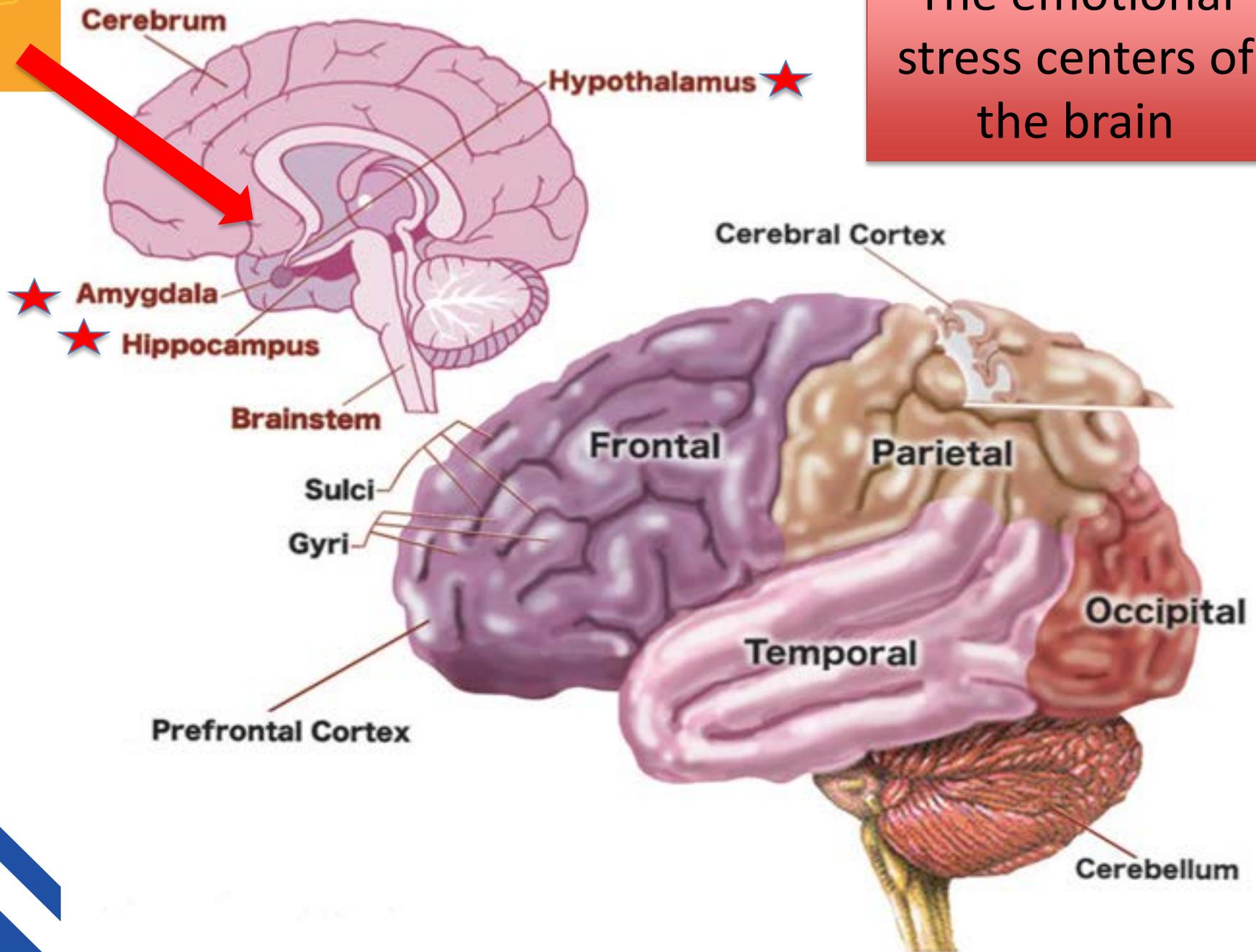


Brain Development



We Can Do Something

The emotional stress centers of the brain





Stress Shapes the Brain

- **Positive Stress is**
 - **Is brief, infrequent, mild or moderate**
 - **Is normal in everyday life**
 - **Motivates, builds exploration and curiosity, and teaches the child to adjust**

**The child's social and emotional supports
help manage stress
and allow a return to normal**

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Prolonged Stress can Harm a Child



- Poor nutrition
- Illness
- Injury or trauma
- Neglect
- Violence
- Family problems
- Environmental toxins
- Inadequate health care



<http://feedingamerica.org/SiteFiles/child-economy-study.pdf>

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Toxic Stress Damages Brain

- **Toxic Stress**

- **Long lasting, frequent, or intense**
- **Adverse childhood events (ACEs)**
- ***Perceived* by the child as overwhelming**
- **Results in**
 - **Anxiety**
 - **Anger**
 - **Emotional outbursts**
 - **Fear**

**Harmful if the child does not have enough
social and emotional buffers**



ACE Categories

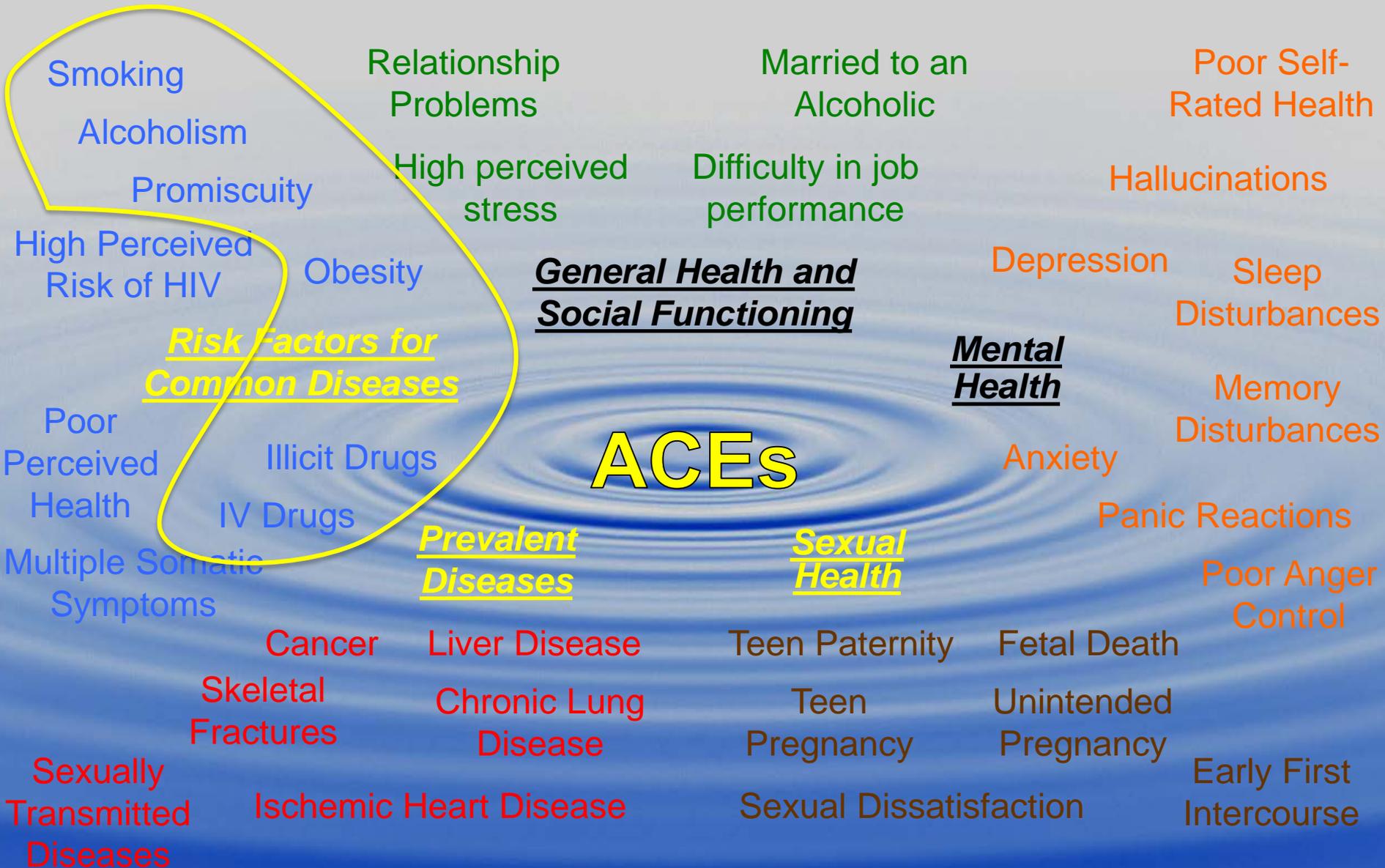


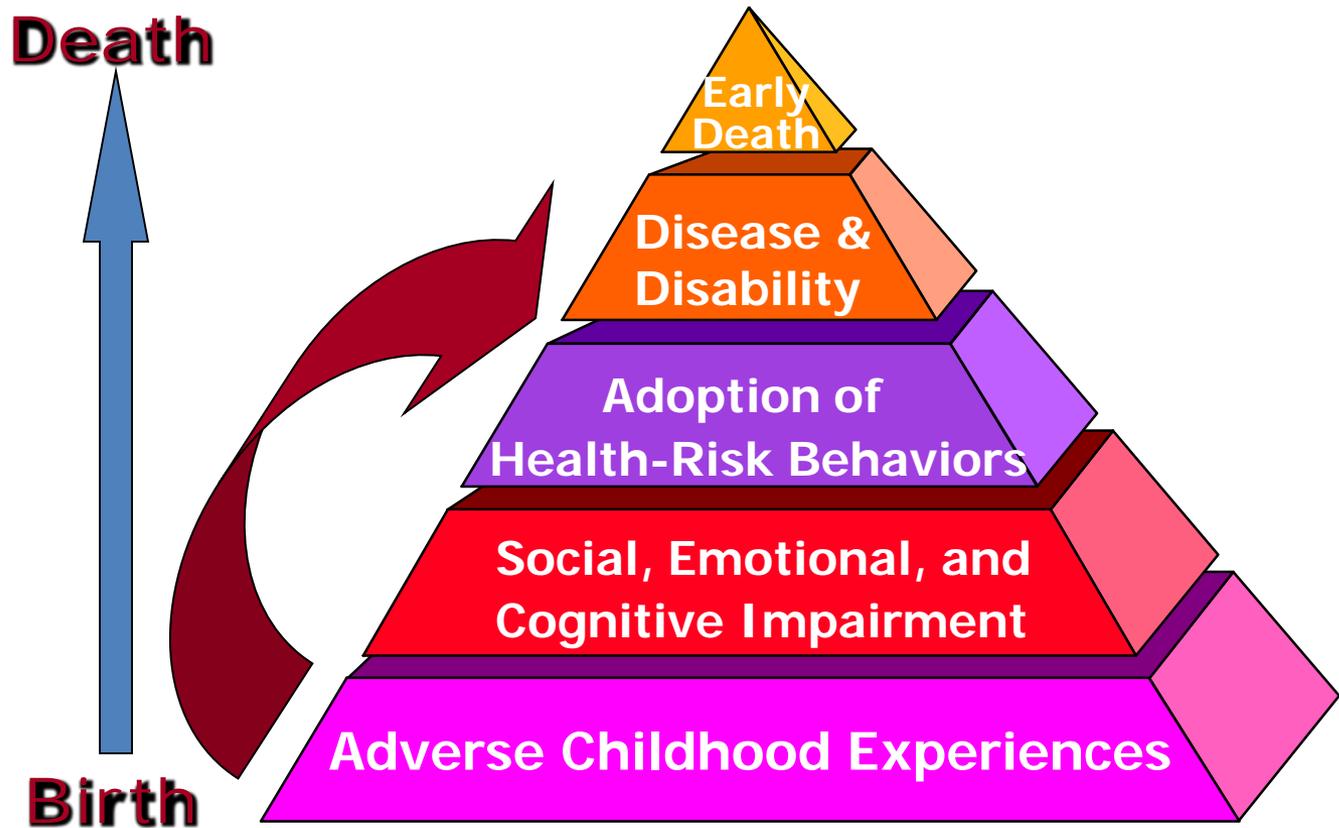
	Women (n=9,367)	Men (n=7,970)	Total (17,337)
• Abuse			
– Emotional	13.1%	7.6%	10.6%
– Physical	27.0%	29.9%	28.3% 1:4!
– Sexual	24.7%	16.0%	20.7% ←
• Household Dysfunction			
– Mother Treated Violently	13.7%	11.5%	12.7%
– Household Substance Abuse	29.5%	23.8%	26.9% 1:4!
– Household Mental Illness	23.3%	14.8%	19.4% ←
– Parental Separation or Divorce	24.5%	21.8%	23.3% ←
– Incarcerated Household Member	5.2%	4.1%	4.7%
• Neglect*			
– Emotional	16.7%	12.4%	14.8%
– Physical	9.2%	10.7%	9.9%

* Wave 2 data only (n=8,667)

Data from www.cdc.gov/nccdphp/ace/demographics

ACEs Impact Multiple Outcomes





ACEs Impact Life Long Health

We Can Build

SOCIAL-EMOTIONAL BUFFERS

Self-Regulation

Coping, Persistence

Organization, Planning

Relief of anxiety and stress

Curiosity, Exploration

- **Learned, practiced**
- **Modeled by others**
- **Turns off emotional over-reactions**
- **Increases test scores in school**

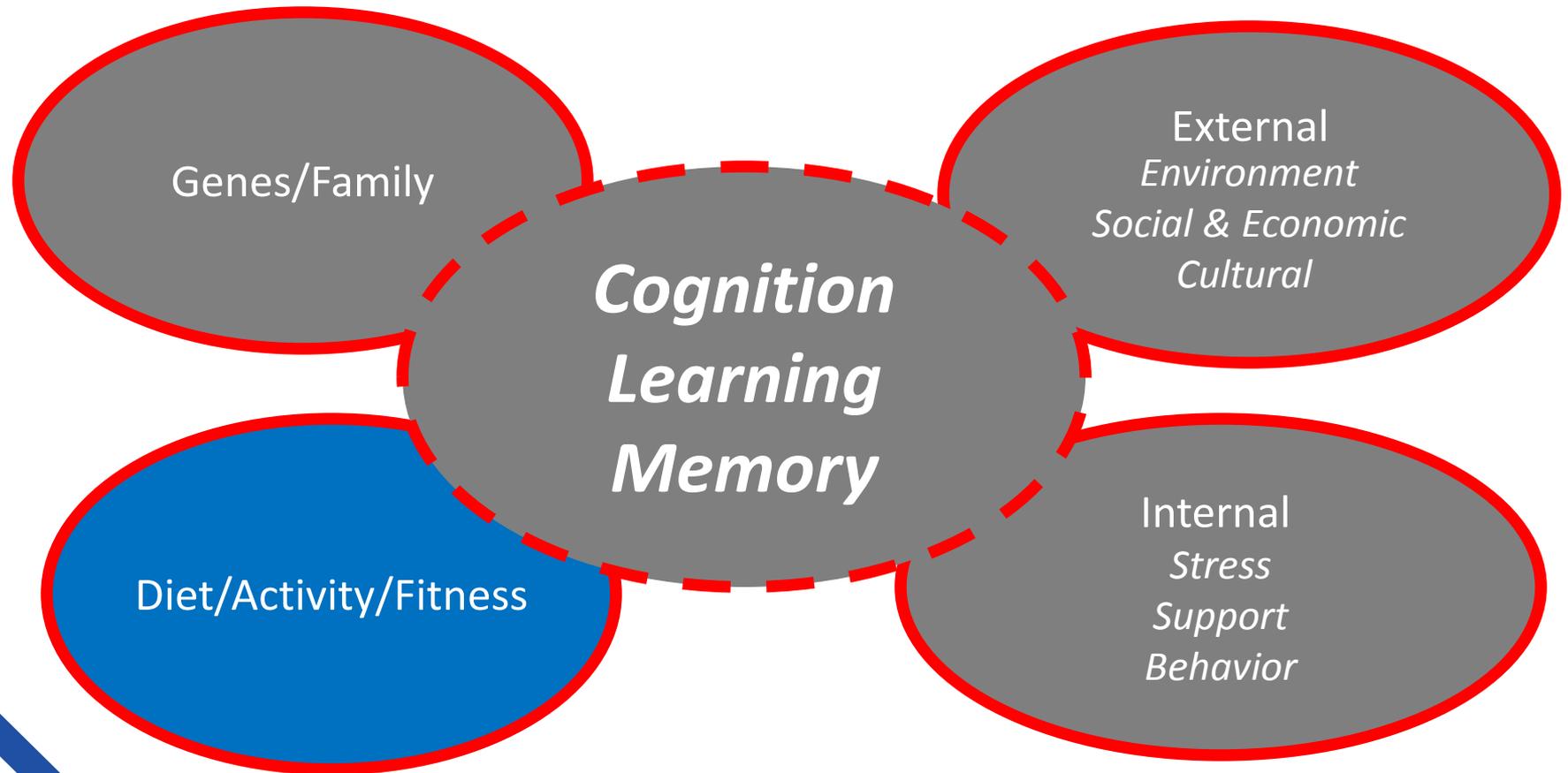


Lickers & Groomers

- Handling rat pups caused anxiety = stress
- Maternal behavior*
 - High L&G
 - Low L&G
- High = greater exploration, curiosity, socialization, healthier, less anxious, less aggressive
- Biochemical changes in brain



Brain Development



We Can Do Something



Overweight

Undernourished

Unfit



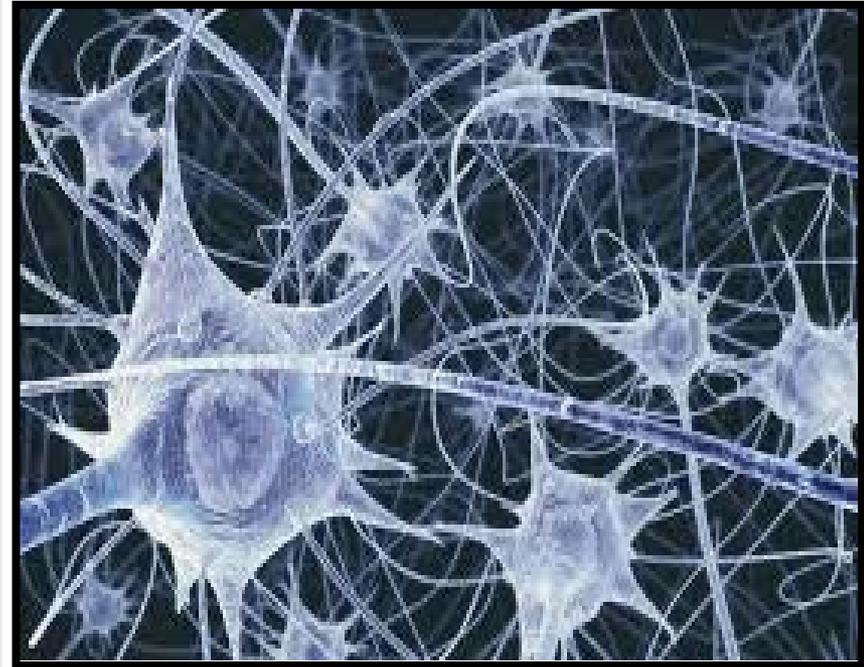
What you eat or don't eat matters to your brain

*Brain cells use nearly
20%
of all our daily calories:
-2/3 for brain cell
communication
-1/3 for "housekeeping"*



A Good Diet Changes the Brain

- *More brain cells*
- *Stronger connections*
- *Faster communication*
- *More blood flow*
- *More glucose & oxygen*
- *Rapid repair*





**NO
CHILD
SHOULD
GROW UP
HUNGRY.**



Hunger Impacts

Mental Health & Development

- Worse developmental outcomes
- Psychosocial, behavioral, and attention problems
- Depressive and suicidal symptoms in adolescents
- Lower academic performance



1 IN 5 CHILDREN LIVES IN POVERTY



Weinreb; Pediatrics; 2002; 110; e41
Dunifon; Social Service Review; 2003; 77; 72–92
Kleinman; Pediatrics; 1998; 101; e3.
Murphy; Journal of the American Academy of Child and Adolescent Psychiatry; 1998; 37 (2), 163–170
Whitaker; Pediatrics; 2006; 118(3); e859–e868
Slack; Social Service Review; 2005; 79(3); 511–536
Jyoti; Journal of Nutrition; 2005; 135; 2831–2839
Rose-Jacobs; Pediatrics; 2008; 121(1); 65–72
Skalicky; Maternal and Child Health Journal; 2006; 10(2); 177–185

The School Nutrition Success Story

- 55 million students
- 32 million lunches/d
- 35-40% kcals school vs 56% kcals at home
- Improve nutrition
- Lessen obesity
- Improve behavior
- Boost academic achievement



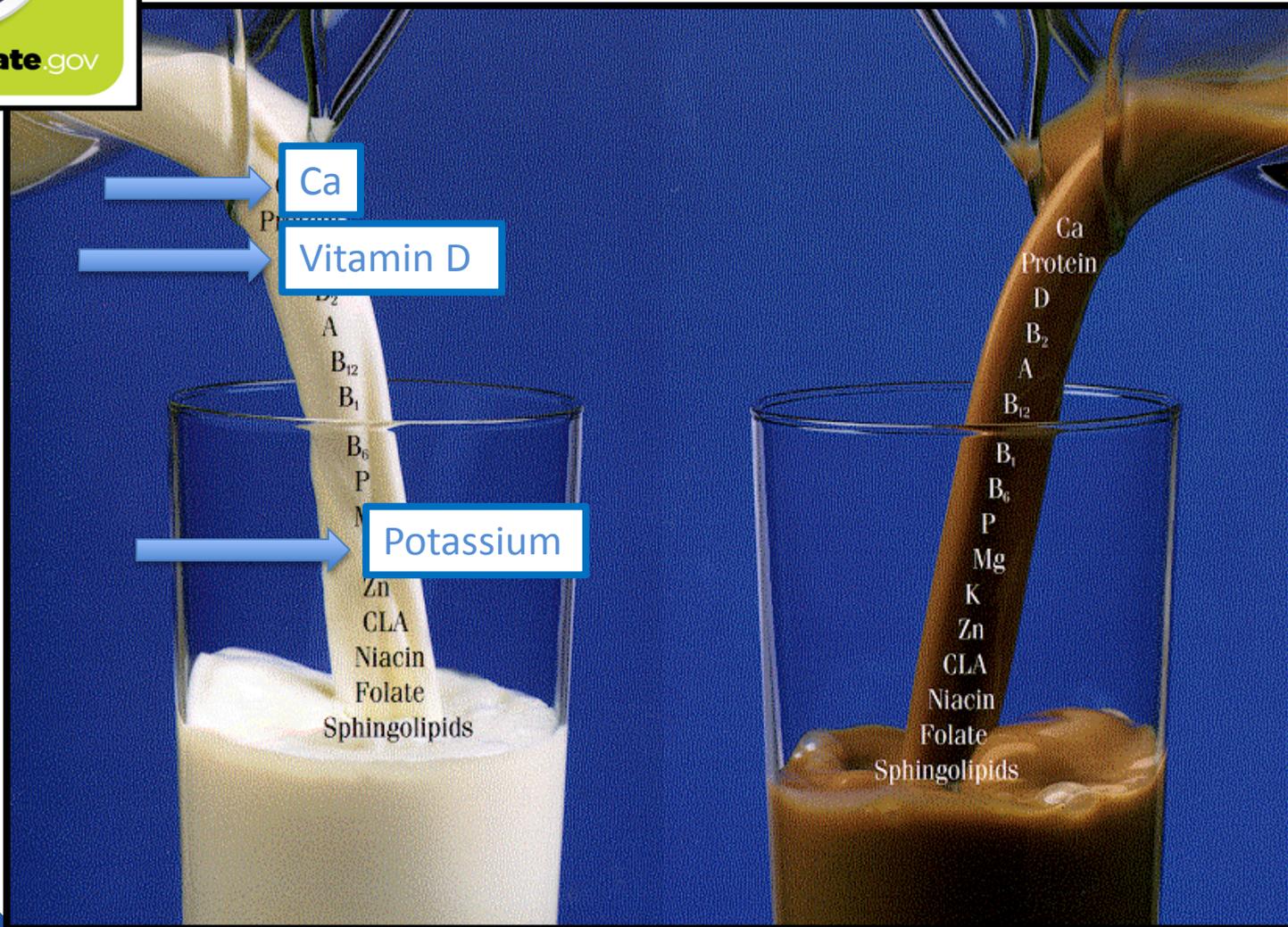
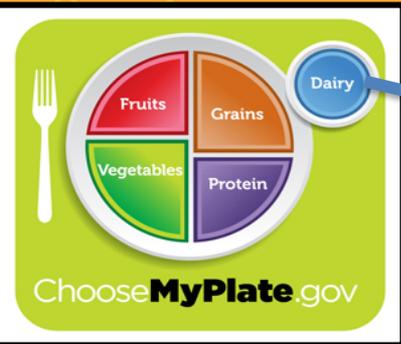
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One Power Drink

Milk at Meals



4 Nutrients of Public Health Concern: Ca, Vit D, Fiber, Potassium

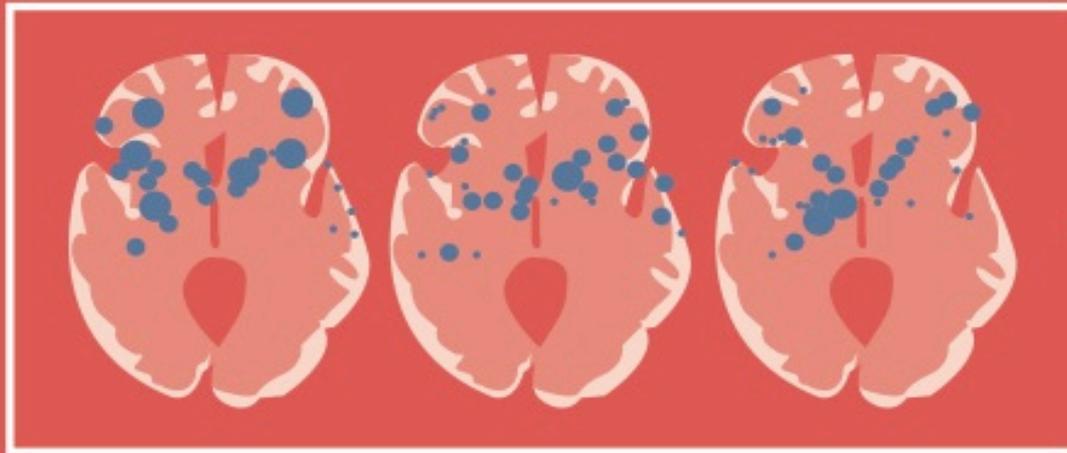


Breakfast is the most Critical

The Brain Thrives on Good Food



Food Provides Fuel



Hungry Child
The Mid-Brain
is focused on food
Grouchy
Restless
Anxious



After Eating
The Front Brain
is in working mode
Calm
Organized
Thoughtful
Alert

School Breakfast

In National Surveys

20% children, 31% teens skip

- Eating School Breakfast:
 - Vit A and C, calcium, iron, fiber, whole grain
 - Lower weight, more muscle mass
- Ready to Eat cereals:
 - 36% children, 25% teens consume
 - More Vit A, iron, folate, whole grain



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Breakfast & Body Weight



In children, adolescents & adults

Regular breakfast =

Lower weight

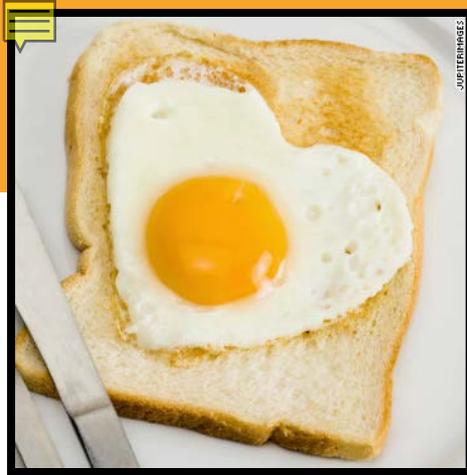
Skippers are *twice* as likely to be overweight

Nutritional Contributions of School Breakfast Program

- Greater energy/ day
- Vit C
- Phosphorus
- Calcium
- Magnesium
- Riboflavin
- Fiber



*Energy and micronutrients not consumed at breakfast
are not made up over 24 hrs*



And yet...Only 1/3 of Eligible Kids Get Breakfast at School!

School Breakfast

Improves

- Attendance
- Behavior
- Classroom participation
- Attentiveness
- Concentration
- Math and reading scores
- Standardized test scores
- Cognitive test speed
- Vocabulary

Decreases

- Anxiety
- School nurse visits
- Tardiness
- Absenteeism^{1,2}

School breakfast programs also make economic sense and have been shown to increase revenue in the food service department.²



45 Studies

Breakfast Science

- **Nearly all showed a positive effect**
 - Vulnerable kids most effect
 - *School* BF most consistent effect
- Math & Memory better
- Memory, attention better
 - Late morning especially
 - Better on more demanding tests
- **High-risk children** showed better
 - Verbal skills
 - Memory
 - Matching tests

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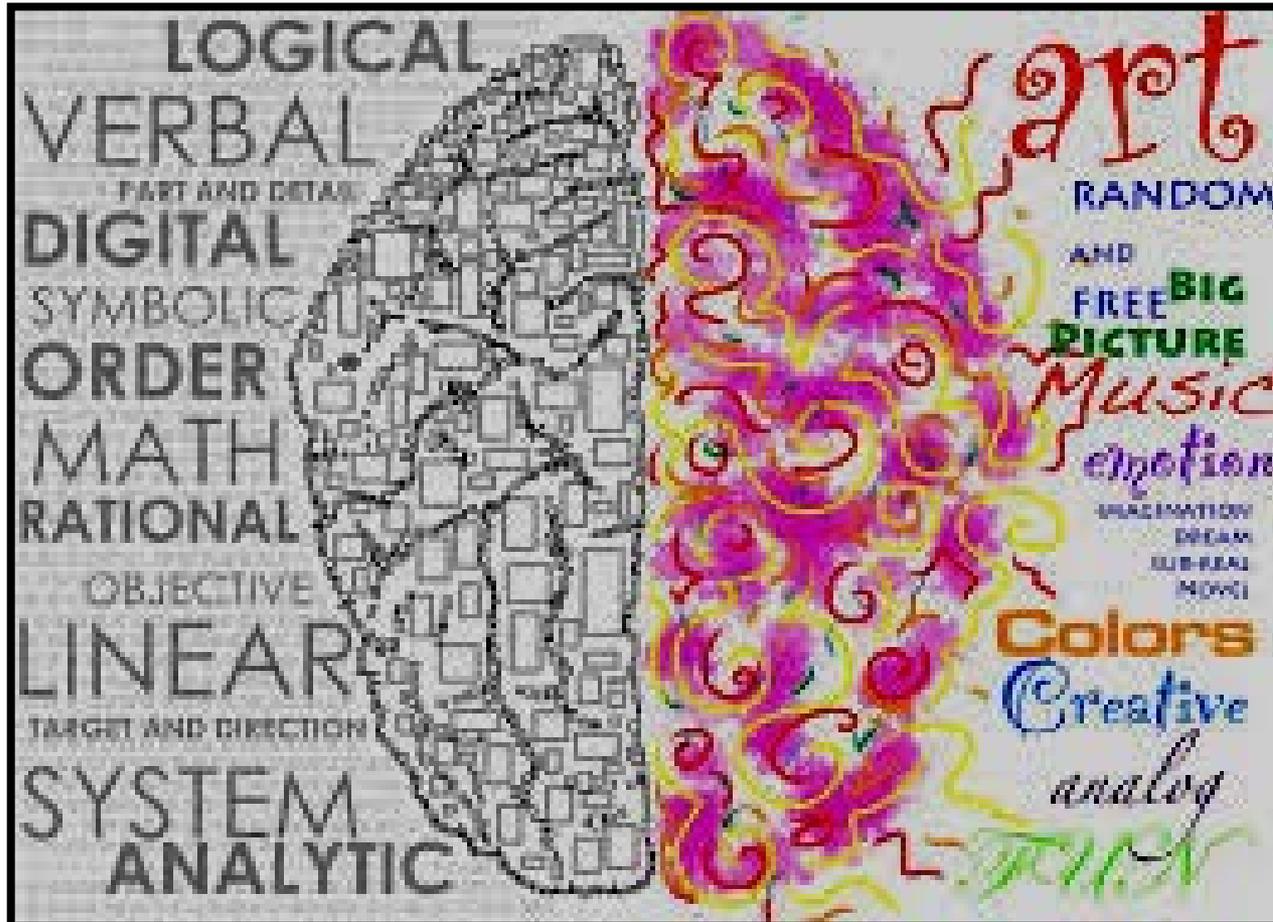


Breakfast

Makes a Difference

Glucose
Fuels the
Brain

Offers
nutrients
to
maintain
the Brain



Lowers
risk
of
Obesity

Makes
a
better
student

FITNESS & PA

The classroom is where students spend a majority of their time and this provides a viable location for interventions designed to increase physical activity.
Preventive Medicine, 2011.



Building Cognitive Control



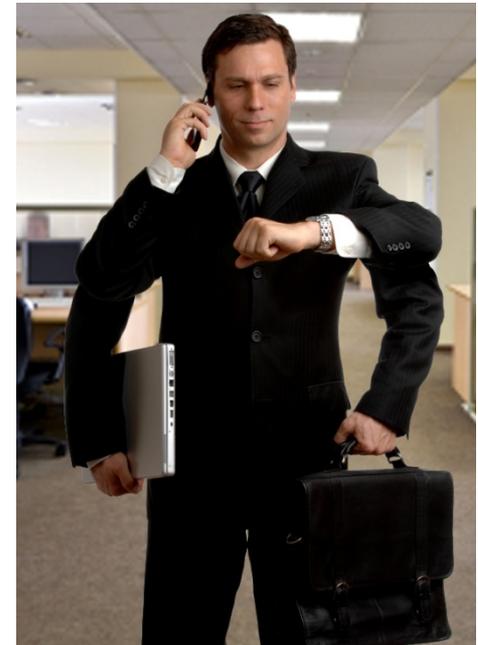
Inhibition

the ability to ignore distraction & stay focused



Working Memory

the ability to hold information in mind and manipulate it



Cognitive Flexibility

the ability to switch perspectives, focus of attention, or response mappings

Executive Function = Prefrontal Cortex

When Functional...

- Make plans
- Keep track of multiple things
- Discuss using past knowledge
- Evaluate ideas, reflect on work
- Make corrections
- Engage in group dynamics
- Control impulsivity

When Dysfunctional, *struggles*...

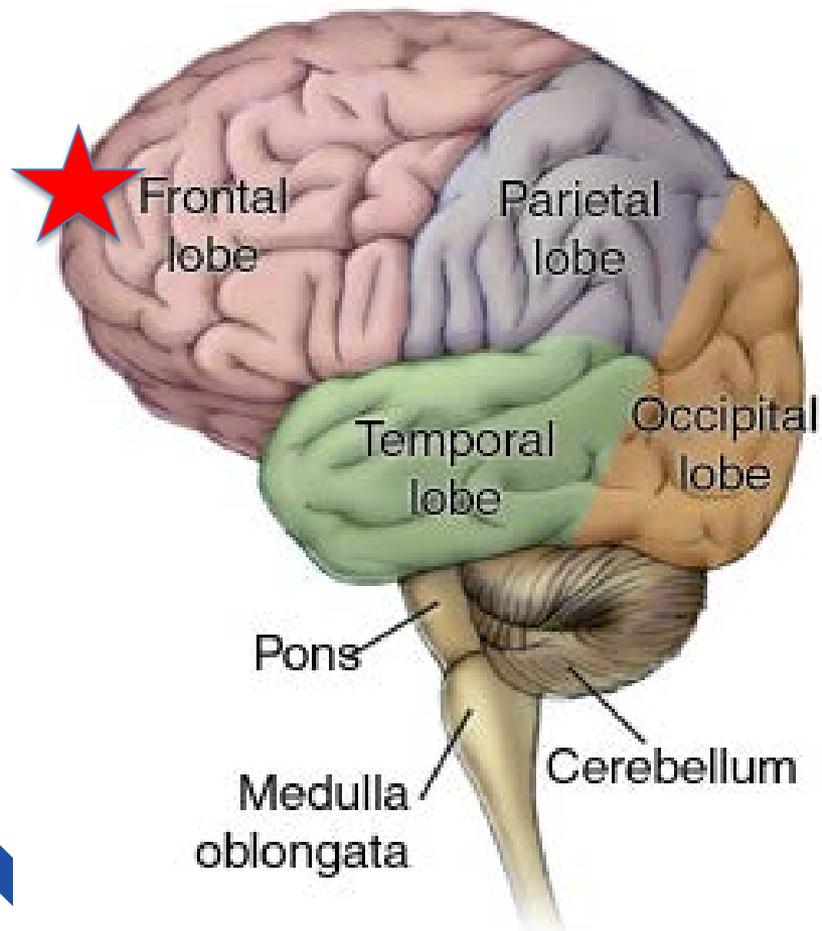
- Planning projects
- Time management
- Verbal, written stories in a sequential manner
- Memorizing and retrieving key information
- Initiating tasks or generating ideas independently
- Retaining information while using it (working memory)

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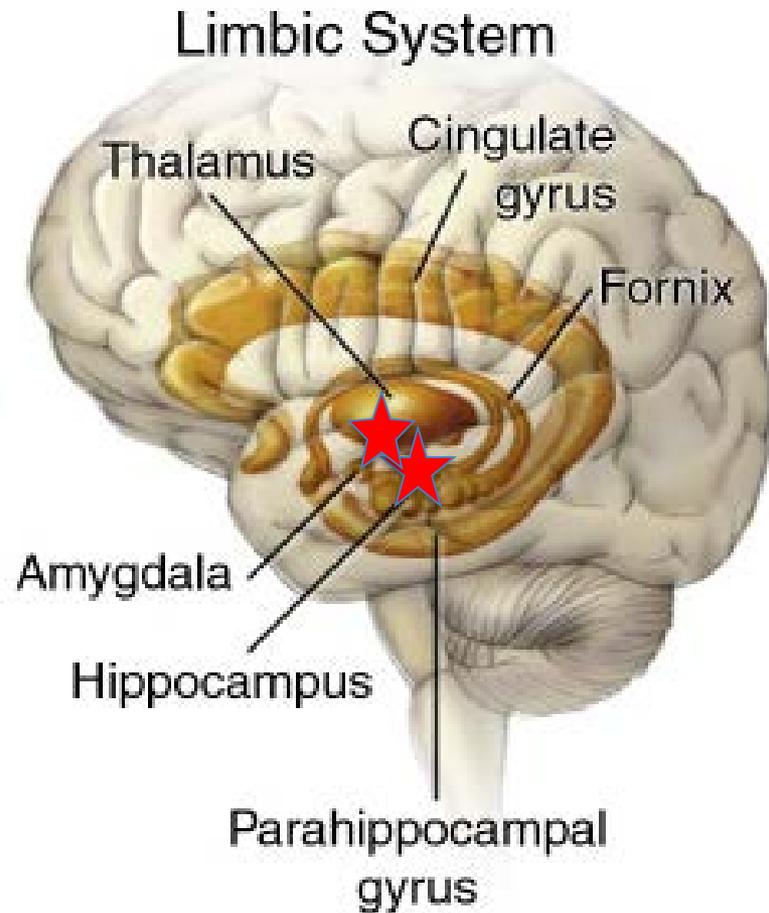
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Cognition is a Struggle

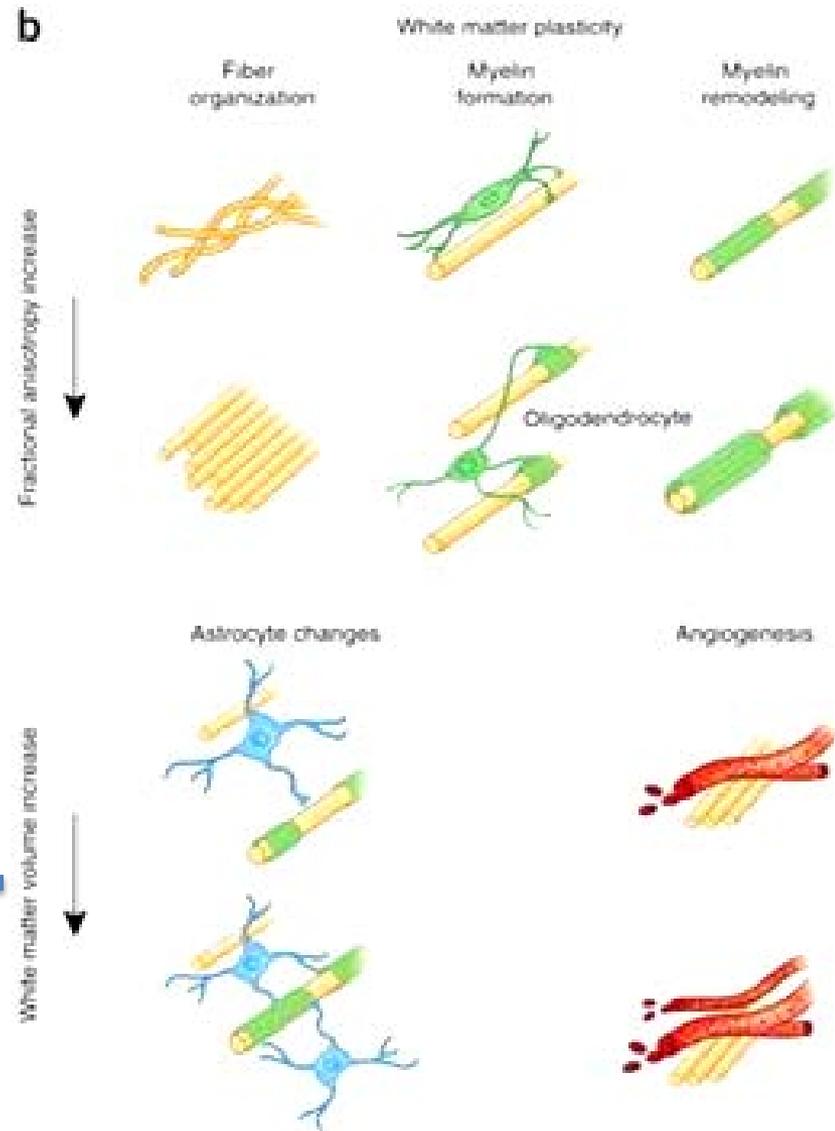
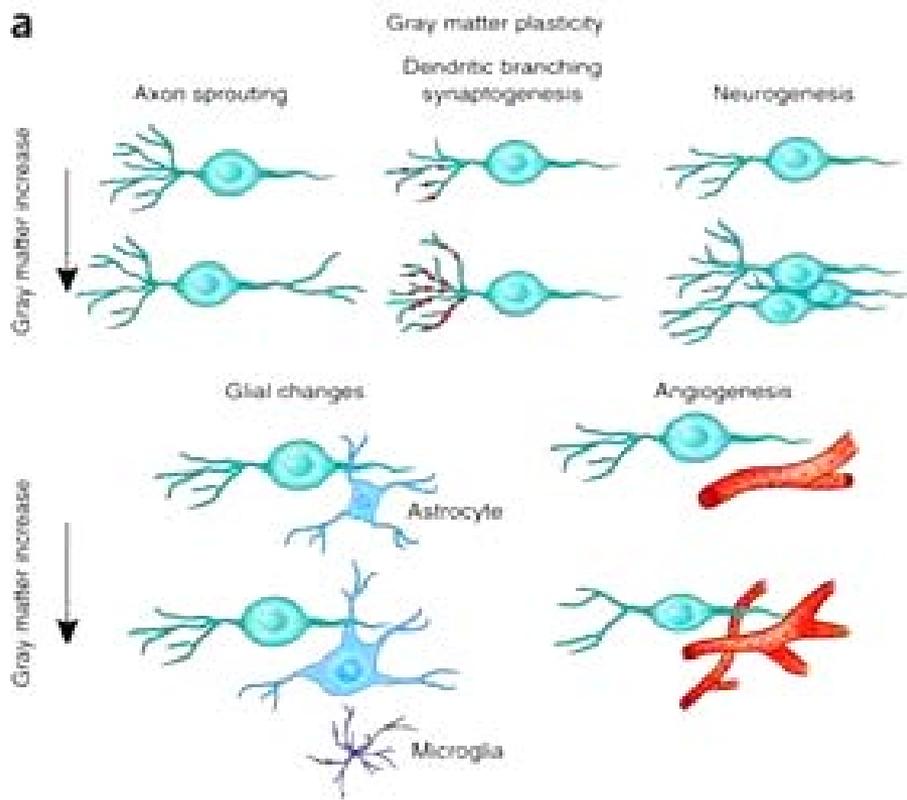


Cool Intelligence



Hot Intelligence

How Play* Shapes the Brain



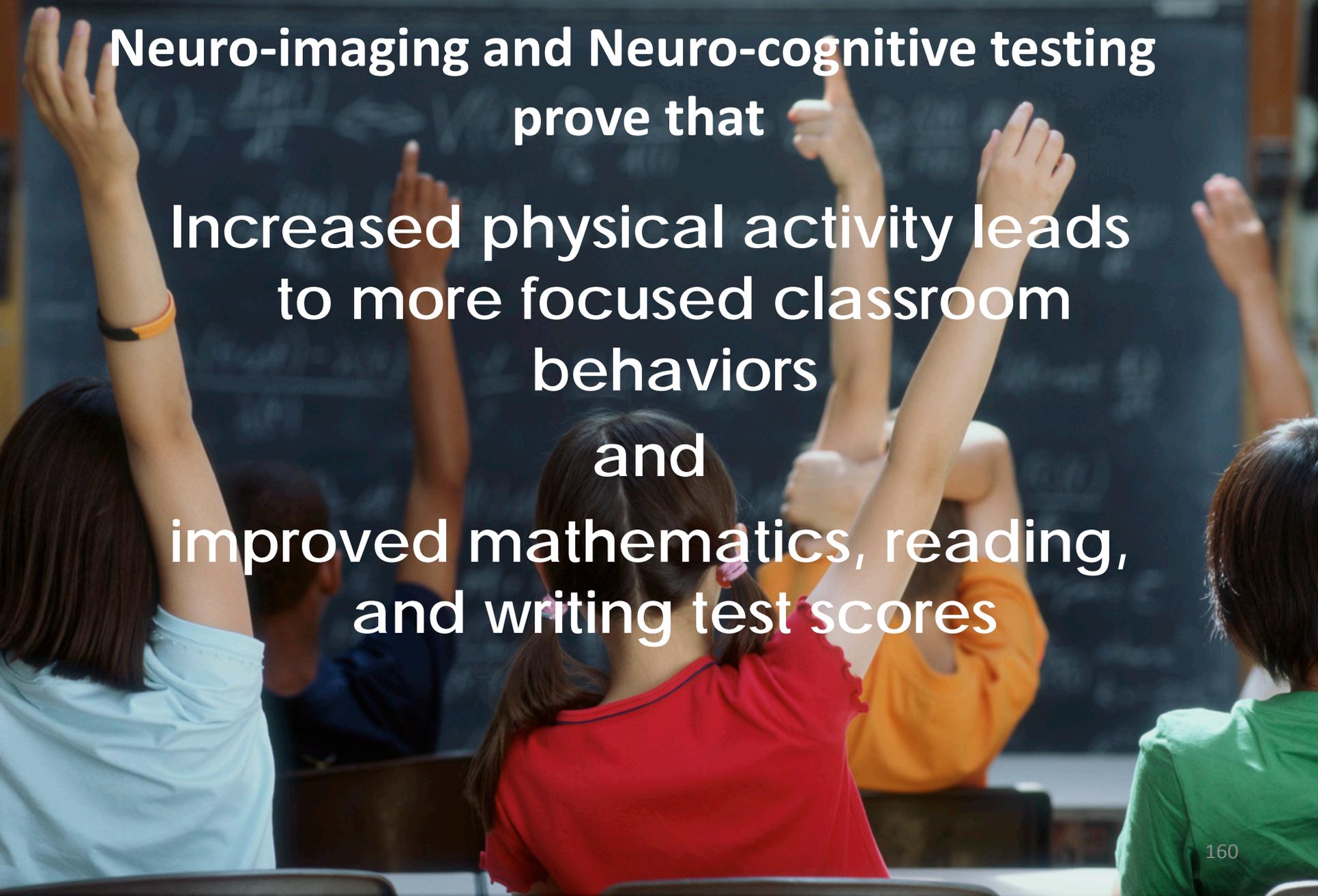
- *More connections between neurons*
- *Faster communication between neurons*
- *Greater blood flow: glucose, oxygen*



Neuro-imaging and Neuro-cognitive testing
prove that

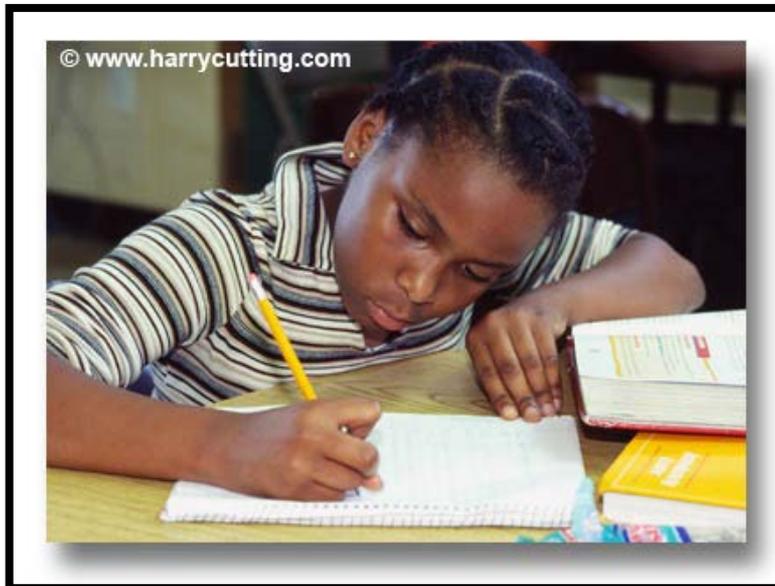
Increased physical activity leads
to more focused classroom
behaviors

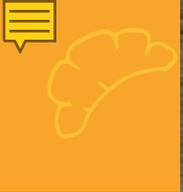
and
improved mathematics, reading,
and writing test scores





Optimal cognitive processing
in a child
necessitates
a period of decompression
after a period of
concentrated instruction





Recess is ...

Regularly scheduled periods within the [elementary school] day for unstructured physical activity and play.

(CDC, 1997)



Recess Augments PE

Recess is *not* a substitute for PE

PE is education,
teaching the acquisition
of motor skills
for
life-long
physical activities
and free play





PLAY* DEVELOPS SOCIAL & EMOTIONAL SKILLS

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Play* =
A Life Skills Class

Social
Emotional
Learning

Adapt, adjust to complex school environment

Practice and role-play social skills

**Learn communication skills:
negotiation, cooperation, sharing
and problem-solving**





<http://liinkproject.tcu.edu/>





We can't raise
a child's IQ,
and we aren't
their teachers,
but if we are allowed

through improved nutrition
and regular physical activity
***we can put a better student
in the chair***

-Robert Murray MD

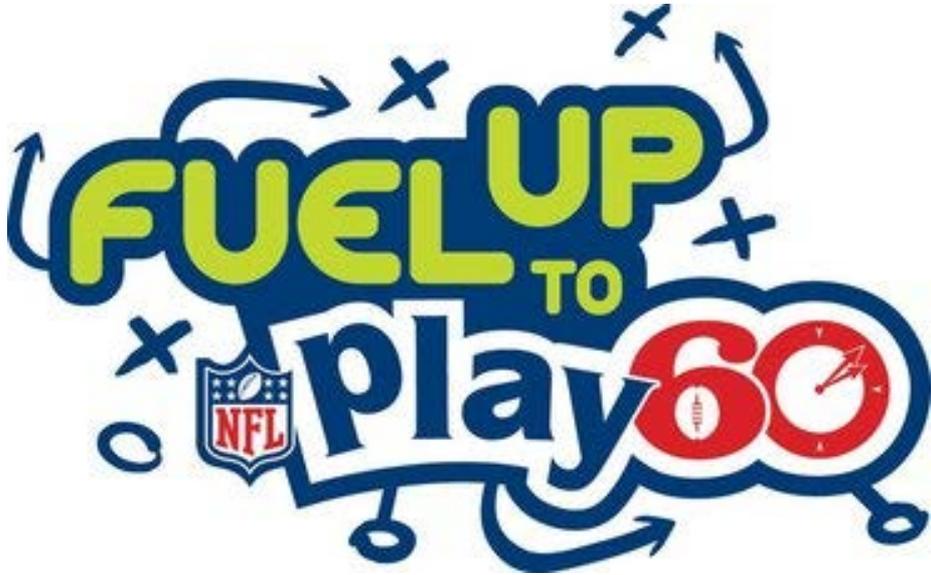
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Fuel Up to Play 60

Child-Led Wellness Programs



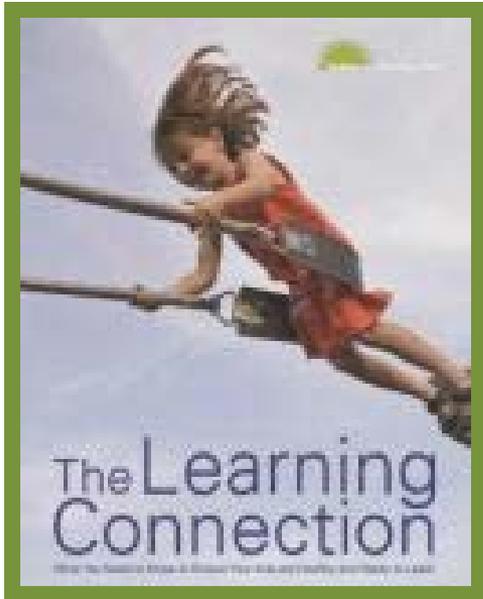
<http://www.fueluptoplay60.com/>

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Tell the Story



55 MILLION SCHOOL KIDS

Each one of us can help improve the eating and activity habits of the 55 MILLION school kids in this country and, in the process, improve their health so they can succeed in the classroom.

GOOD FOOD
+
ACTIVE BODIES
=
KIDS EQUIPPED FOR SUCCESS!

Kids who attend "healthy" schools have fewer absences, higher academic achievement and self-esteem and are more likely to graduate from high school.

PHYSICAL ACTIVITY SUPPORTS ACHIEVEMENT
Even moderate exercise, like walking, increases brain activity.

KIDS WHO EAT WELL, LEARN BETTER
Students who eat school breakfast have been shown, on average, to attend 1.5 more days of school per year and score 17.5% higher on standardized math tests.

HEALTHIER PRACTICES CAN INCREASE SCHOOLS' BOTTOM LINES
Schools can get a financial boost by offering more nutritious meals & snacks. Students will buy and eat healthier foods and beverages.

EVERY KID HEALTHY

Visit ActionforHealthyKids.org, where you can read *The Learning Connection: What You Need to Know to Ensure Your Kids Are Healthy and Ready to Learn* and in under 1 minute, you can take the *Every Kid Healthy Pledge*. You'll have access to our free programs, volunteer opportunities and school grants.

Action for Healthy Kids® Northwestern Mutual Foundation

The Wellness Impact:
Enhancing Academic Success through Healthy School Environments

GENYOU®
NATIONAL DAIRY COUNCIL
AMERICAN COLLEGE OF NUTRITION EDUCATION
American School Health Association

FIND THE FULL STORY! Bookmark these resources!

- * Learning Connection Summit-- <http://www.ohioactionforhealthykids.org/resources/school-wellness/healthy-students-are-better-learners/>
- * Wellness Impact Report-- <http://www.drink-milk.com/child-nutrition/learning-connection.aspx#.UjGwNMBkt6k>
- * Learning Connection Report--<http://www.actionforhealthykids.org/media-center/reports>

“It is easier to build strong children, than to repair broken men.”

–Frederick Douglass



Recess Before Lunch



Line up
at noon

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How to Make IT Happen

- Operations Station: Section 101
- Teacher Station: Section 103
- Principal Station: Section 105
- School Nurse Station: Section 107
- Stump the Coach: Section 109
- Michigan Dept of Ed Station: Section 111
- Vendor Station: Concourse



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- Break
 - Please return at 2:30



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Moving the Agenda Forward: What's Your '30-'90?

Sara Gold, MSW

Director

Healthy Kids

United Way for Southeastern Michigan



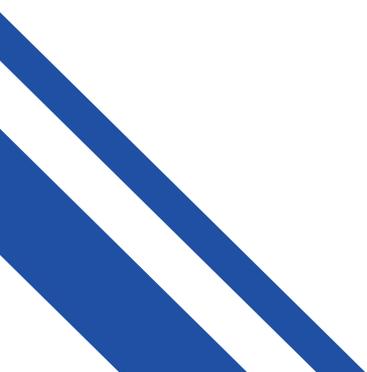
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Wrap Up and Drawings



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